Epidemiologie der Persönlichkeitsstörungen:

Evidenz für eine biopsychosoziale Perspektive

Abhandlung

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Für meine Eltern

Albert und Joëlle Hengartner-Brancotte

VORWORT

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ZUSAMMENFASSUNG

Diese Arbeit fokussiert im Sinne des biopsychosozialen Krankheitsmodells auf neurokognitive Korrelate von Persönlichkeitsstörungen (bezeichnend für die biologische Ebene), auf die latente übergeordnete Struktur von normaler und pathologischer Persönlichkeit (bezeichnend für die psychologische Ebene) und auf Umweltfaktoren von Persönlichkeitsstörungen (bezeichnend für die soziale Ebene). In Studie 1 wurden die gemeinsamen Faktoren normaler und pathologischer Persönlichkeit untersucht. Die Studie diente primär einer Validierung der konzeptuellen Revision der Persönlichkeitsstörungen im Rahmen des DSM-5. Die extrahierte Struktur repräsentierte sehr genau die für DSM-5 vorgeschlagenen Dimensionen „negative Affektivität“, „soziale Distanziertheit“, „Feindseligkeit“, „Enthemmung“ und „Psychotizismus“. In Studie 2 wurden die Zusammenhänge zwischen verschiedenen aversiven Kindheitserlebnissen und Persönlichkeitsstörungen analysiert. Es fand sich, dass insbesondere emotionaler Missbrauch als auch Schikanierung und Gewalt in der Schule multivariat bedeutend mit diversen Persönlichkeitsstörungen verknüpft waren. In Studie 3 wurde schließlich untersucht, inwiefern kognitive Fähigkeiten mit Persönlichkeitsstörungen in Beziehung stehen. Die multivariaten Befunde zeigten, dass fast alle Persönlichkeitsstörungen mit tiefer fluider Intelligenz und reduzierten emotionalen Empathiefähigkeiten assoziiert waren. Zusammen liefern die drei Studien weitere empirische Evidenz für ein interaktionales und multifaktorielles Gen-Umwelt Modell der Persönlichkeitsstörungen.

ABSTRACT

In accordance with the bio-psycho-social model of mental disorders, the main objective of this PhD thesis was to examine associations between personality disorders and cognitive abilities (indicative of the biological domain), the latent structure of normal and pathological personality functioning (indicative of the psychological domain) and environmental risk factors of personality disorders (indicative of the social domain). In study 1 we examined the joint higher-order factors of normal and pathological personality. This paper principally served as a validation of the revised conceptualization of personality disorders in DSM-5. The five extracted factors closely matched the dimensions negative affectivity, detachment, antagonism, disinhibition, and psychoticism as proposed for DSM-5. In study 2 we analyzed various forms of childhood adversity in association with personality disorder dimensions. The results showed that in particular emotional abuse and bullying as well as conduct problems in school were multivariately strongly related to various personality disorder dimensions. Finally, in study 3 we focused on the relationship between cognitive abilities and personality disorder dimensions. The multivariate analysis demonstrated that most dimensions of personality disorders were significantly associated with low fluid intelligence and reduced emotional empathy. In conclusion, taken together the results of the three studies provide further evidence for an interactional multi-factorial gen-environment model of personality disorders.

INHALTSVERZEICHNIS

1. EINLEITUNG

1.1. Gliederung

Vorweg wird kurz die aktuell gültige Definition der Persönlichkeitsstörungen erläutert (Kapitel 1.2.). Da sich in der internationalen Forschung klar die Terminologie und Operationalisierung nach DSM-IV (American Psychiatric Association, 1994) gegenüber der ICD-10 (World Health Organization, 1992) durchgesetzt hat, wird diese nachfolgend durchwegs verwendet. In Europa werden in der klinischen Praxis jedoch vorwiegend die Kriterien nach ICD-10 angewandt, weshalb eingangs einige grundlegende Vergleiche zwischen den beiden Diagnose-Systemen hergestellt werden. Im Folgenden werden wichtige epidemiologische Kennzahlen zu Prävalenz und Komorbidität präsentiert (Kapitel 1.3.). Da diese Aspekte entscheidend für einzelne Fragestellungen dieser Arbeit sind, werden sie anschließend im übergeordneten Kontext der Konzeptualisierung der Persönlichkeitsstörungen ausführlich erläutert und diskutiert (Kapitel 1.4.). In Kapitel 1.5. wird schließlich gezielt und dezidiert auf den theoretischen Hintergrund der drei empirischen Arbeiten eingegangen. Mit Bezug auf das biopsychosoziale Krankheitsmodell (Engel, 1977) werden die drei Themengebiete grob vereinfacht in eine biologische, eine psychologische, und eine soziale Ebene eingeteilt. Diese Kategorisierung dient vorwiegend der Veranschaulichung und einer sprachlichen Adaption an die biopsychosoziale Konzeption, und weniger einer strikten, empirisch fundierten Einteilung.

1.2. Definition der Persönlichkeitsstörungen

Die aktuellen Diagnosesysteme DSM-IV-TR (American Psychiatric Association, 2000) und ICD-10 (World Health Organization, 1992) definieren Persönlichkeitsstörungen als ein übergreifendes und stabiles Muster des inneren Erlebens und Verhaltens, welches Denken, Affektivität, zwischenmenschliche Beziehungen und Impulskontrolle beeinflusst. Diese überdauernden, charakteristischen Persönlichkeitszüge sind maladaptiv und unflexibel und

weichen deutlich von der vorherrschenden soziokulturellen Norm ab. Die Entstehung dieser starren Verhaltens- und Erlebensmuster reicht mindestens bis in die Adoleszenz oder frühes Erwachsenenalter zurück und die Symptomatik verursacht ausgeprägten Leidensdruck und/oder funktionale Beeinträchtigung.

DSM-IV erfasst die Persönlichkeitsstörungen auf einer separaten Achse (Achse II), um sie konzeptuell von den klinischen Störungen (Achse I) abzugrenzen. Die einzelnen Persönlichkeitsstörungen werden 3 übergeordneten Clustern subsumiert. Das Cluster A wird als „sonderbar-exzentrisch“ bezeichnet und beinhaltet die paranoide, die schizoide und die schizotypische Persönlichkeitsstörung. ICD-10 listet die schizotypische Störung unter den schizophrenen Erkrankungen und betont, dass Entwicklung und Verlauf gewöhnlich einer Persönlichkeitsstörung entsprechen. Das Cluster B, umschrieben mit „dramatisch-emotional“, besteht aus der borderline, der histrionischen, der antisozialen und der narzisstischen Persönlichkeitsstörung. Auch hier gibt es ganz leichte Abweichungen zu ICD-10, welches die borderline Persönlichkeitsstörung als emotional instabile Persönlichkeitsstörung bezeichnet und zwei Untertypen – „borderline Typ“ und „impulsiver Typ“ – unterscheidet. Zudem wird die narzisstische Persönlichkeitsstörung nur unter der Restkategorie „nicht näher bezeichnete Störungen“ geführt. Das Cluster C, genannt „ängstlich-vermeidend“, beinhaltet die vermeidende, die abhängige und die zwanghafte Persönlichkeitsstörung. Letztere wird in ICD-10 als anankastische Störung bezeichnet.

Ein wesentlicher Unterschied zwischen DSM-IV und ICD-10 bilden die diagnostischen Algorithmen der einzelnen Störungen. ICD-10 verlangt grundsätzlich mehr Kriterien als DSM-IV, was zur Konsequenz hat, dass nach DSM-IV Kriterien Persönlichkeitsstörungen eher diagnostiziert werden als nach ICD-10 Kriterien. Folglich fallen Prävalenzschätzungen auch deutlich höher aus, wenn sie auf DSM-IV Kriterien beruhen (Samuels, 2011).

1.3. Prävalenz und Komorbidität der Persönlichkeitsstörungen

Eine wichtige Herausforderung für die Forschung auf dem Gebiet der Persönlichkeitsstörungen ist die Durchführung präziser epidemiologischer Erhebungen (Coid, 2003). Gemäß dem Bezugssystem des „Public Health“ und seinem problemlösungsorientierten Ansatz wird die deskriptive epidemiologische Forschung oftmals als wissenschaftliche Grundbasis aufgefasst (Goldner, 2002). Deswegen ist es erstaunlich, dass die Prävalenz der Persönlichkeitsstörungen in der Allgemeinbevölkerung bis in die frühen 1990er-Jahre größtenteils unbekannt war (Lenzenweger, 2008). Seither wurden diesbezüglich jedoch viele epidemiologische Studien durchgeführt, so dass man trotz gewisser methodischer Diskrepanzen die Auftretenswahrscheinlichkeit für eine beliebige Persönlichkeitsstörung mit ungefähr 10% angeben kann (Lenzenweger, 2008). Dennoch gibt es regional und in Abhängigkeit von Studiendesign und Erfassungsmethode mitunter deutliche Abweichungen. Folglich können die Prävalenzschätzungen von ca. 4.5% für Großbritannien (Coid, Yang, Tyrer, Roberts, & Ullrich, 2006) bis zu ca. 15% für die Vereinigten Staaten (Crawford et al., 2005; Grant et al., 2004) variieren.

Einer der wichtigsten Aspekte für das Verständnis der Epidemiologie der Persönlichkeitsstörungen ist die Komorbidität zwischen Achse I und Achse II Störungen. Personen mit Persönlichkeitsstörungen haben deutlich erhöhte Raten von Achse I Störungen (Punkt- und Lebenszeit-Prävalenz), insbesondere von affektiven Störungen, Angst- und Substanzstörungen (Cacciola, Alterman, McKay, & Rutherford, 2001; McGlashan et al., 2000). Das Risiko an einer affektiven Störung zu erkranken erhöht sich bei Vorliegen einer Persönlichkeitsstörung ungefähr um den Faktor 7 und die Auftretenswahrscheinlichkeit für eine Angststörungen erhöht sich annähernd um den Faktor 6 (Grant, Hasin, et al., 2005; Lenzenweger, Lane, Loranger, & Kessler, 2007). Persönlichkeitsstörungen sind jedoch nicht nur mit der erhöhten Prävalenz von Achse I Störungen assoziiert, sondern auch mit dem Schweregrad, dem Rezidiv und der Chronizität dieser Störungen sowie dem Ausmaß der

funktionalen Beeinträchtigung durch diese Störungen (Gunderson et al., 2008; Massion et al., 2002; Skodol et al., 2005; Skodol et al., 1999).

Besondere Beachtung verlangt jedoch nicht nur die Komorbidität zwischen den Achsen, sondern auch die Komorbidität innerhalb der Achse II. Diesbezüglich wurde gezeigt, dass eine Person häufig die Kriterien für gleich mehrere Persönlichkeitsstörungen erfüllt (Ekselius, Tillfors, Furmark, & Fredrikson, 2001; Grant, Stinson, Dawson, Chou, & Ruan, 2005; Lenzenweger et al., 2007; McGlashan et al., 2000; Torgersen, Kringlen, & Cramer, 2001). Komorbide Persönlichkeitsstörungen bilden folglich nicht die Ausnahme, sondern die Regel.

Über die Gründe für dieses hohe Ausmaß an Komorbidität innerhalb und zwischen den Achsen existieren jedoch weit weniger eindeutige Befunde und das Phänomen ist insbesondere im Hinblick auf die Revision der Diagnosesysteme ein aktuell sehr kontrovers diskutiertes Thema. Mögliche Erklärungen für die hohe Komorbidität liefert unter anderem das nachfolgende Kapitel 1.4.

1.4. Konzeptualisierung der Persönlichkeitsstörungen

Die Kritik an der Erfassung, Konzeptualisierung und Kategorisierung der Persönlichkeitsstörungen hat in den letzten Jahren stark zugenommen, insbesondere auch im Hinblick auf die Revision der Diagnosesysteme DSM und ICD (Clark, 2007; Farmer, 2000; Widiger, 2003). Die gültige Definition und Operationalisierung der Persönlichkeitsstörungen ist zu wenig akkurat und adäquat (Farmer, 2000). Widiger (2003) nennt drei Hauptursachen für die unscharfe Abgrenzung der beiden Achsen und der einzelnen Persönlichkeitsstörungen. Diese sind 1) unzureichende Erfassungsinstrumente, 2) unzureichende Diagnosekriterien und 3) fehlende empirische Grundlagen für eine sinnvolle Abgrenzung. Es wird angenommen, dass Komorbidität zwischen den Achsen, die ausschließlich simultan, aber nicht longitudinal auftritt, ein Artefakt darstellt und auf mangelnde Validität wie überlappende oder geteilte, unspezifische Kriterien zurückzuführen ist (Clark, 2007).

Die „DSM-V Research Planning Conference on Personality Disorders", abgehalten im Dezember 2004 in Arlington, USA, hält in ihrem Abschlussbericht fest, dass die Mehrzahl der psychiatrischen Symptome sich auf einem Kontinuum situiert, weshalb keine eindeutige Abgrenzung zwischen Störung und Normbereich möglich ist. Persönlichkeitsstörungen manifestieren sich demzufolge weniger als diskrete klinische Zustandsbilder, sonder viel eher als Abgrenzungen entlang einer kontinuierlichen Dimension der allgemeinen Persönlichkeitsfunktion, weshalb eine Neudefinierung des kategorialen Konstrukts angezeigt ist (Widiger, Simonsen, Krueger, Livesley, & Verheul, 2005). Der Vorteil eines dimensionalen gegenüber eines kategorialen Modells wäre die Möglichkeit, individuelle und einzigartige Trait-Charakteristiken (d.h. idiosynkratische Persönlichkeitsprofile) zu beschreiben und eine adäquate Abdeckung unterschiedlicher psychopathologischer Persönlichkeitseigenschaften zu ermöglichen (Trull & Durrett, 2005; Widiger et al., 2005).

Der bislang fundierteste Exponent eines dimensionalen Ansatzes ist die Konzeptualisierung der Persönlichkeitsstörungen basierend auf dem Fünf-Faktor-Modell (FFM) der Persönlichkeit (Costa & McCrae, 1992), auch bekannt als die sogenannten „Big Five" (Widiger & Mullins-Sweatt, 2009). Diese fünf Domänen universeller Persönlichkeitsstrukturen beinhalten Neurotizismus, Extraversion, Offenheit, Verträglichkeit und Gewissenhaftigkeit. Der Gebrauch einer allgemeinen und weit verbreiteten Taxonomie zur Beschreibung der Persönlichkeitsstörungen hat zudem den bedeutenden Vorteil, dass eine beachtliche Menge an Forschungsergebnissen zur normalen Persönlichkeitsstruktur (wie Verhaltensgenetik, Entwicklungspsychologie oder Persönlichkeitspsychologie) genutzt werden könnte. Dadurch würde das Verständnis maladaptiver und pathologischer Persönlichkeitseigenschaften wesentlich erleichtert (Widiger & Lowe, 2008). Und dennoch verfügt die kategoriale Klassifikation immer noch über zahlreiche Verfechter. Livesley (2011) liefert eine spannende Abhandlung über die Gründe, warum sich zahlreiche Exponenten aus Forschung und insbesondere Klinik immer noch gegen eine revidierte, Evidenz-basierte Konzeption der Persönlichkeitsstörungen aussprechen. An dieser Stelle wird jedoch nicht näher darauf eingegangen.

1.5. Biopsychosoziale Merkmale der Persönlichkeitsstörungen

1.5.1. Allgemeine Persönlichkeitsstrukturen: Die psychologische Ebene

Auf die Bedeutung fundamentaler Persönlichkeitseigenschaften wurde bereits im vorangegangenen Kapitel hingewiesen. In diesem Kapitel wird nun dezidiert auf die psychologische Determinante „Persönlichkeit“ eingegangen. Persönlichkeitseigenschaften konstituieren sich natürlich auch auf einer biologischen Ebene (Depue, & Fu, 2011), aus didaktischen Gründen werden sie in dieser Arbeit aber vereinfacht als psychologische Determinanten definiert. Inzwischen deuten zahlreiche konvergierende Befunde darauf hin, dass vier übergeordnete Persönlichkeitsdomänen den Konstrukten unterschiedlicher Persönlichkeitsstörungen zugrunde liegen (Blais, 1997; Deary, Peter, Austin, & Gibson, 1998; Leibing, Jamrozinski, Vormfelde, Stahl, & Doering, 2008; Livesley, Jang, & Vernon, 1998; Mulder & Joyce, 1997; O'Connor, 2005; Saulsman & Page, 2004; Trull & Durrett, 2005; Watson, Clark, & Harkness, 1994; Widiger & Simonsen, 2005). Zudem können Persönlichkeitsstörungen als pathologische Abweichungen dieser Basis-Domänen normaler Persönlichkeit angesehen werden: Der Übergang von normalen (d.h. funktionalen) hin zu pathologischen (d.h. dysfunktionalen) Persönlichkeitsstrukturen ist kontinuierlich (Clark, 2007; Cloninger, 2000; Coker, Samuel, & Widiger, 2002; Krueger & Tackett, 2003; Widiger & Lowe, 2008). Erste Befunde der Verhaltensgenetik deuten zudem darauf hin, dass normale und pathologische Persönlichkeitseigenschaften eine gemeinsame genetische Ätiologie aufweisen (Livesley & Jang, 2008).

Die Persönlichkeitseigenschaft, die für eine allgemeine Persönlichkeitspathologie prädisponiert, ist eng mit der genetischen Vulnerabilität für den Trait Neurotizismus verknüpft (Kendler et al., 2008). Gemäß eines umfassenden meta-analytischen Reviews stellt Neurotizismus den prominentesten Trait dar, welcher Persönlichkeitsstörungen zugrunde liegt (Saulsman & Page, 2004). Nebst Neurotizismus spielen jedoch auch die Traits Verträglichkeit (gegenüber Feindseligkeit), Extraversion (gegenüber Introversion, Absonderung) und Zwanghaftigkeit (Gegenüber Impulsivität, Enthemmung) eine bedeutende Rolle (Livesley et al.,

1998; Trull & Durrett, 2005; Watson et al., 1994; Widiger & Simonsen, 2005). Zusammen scheinen diese vier Eigenschaften die übergeordnete psychopathologische Struktur der Persönlichkeit zu konstituieren. Dies veranlasste Livesley und Jang (2008) zu folgender Aussage:

> "The accumulation of phenotypic and genetic evidence for a four-factor model of personality disorders suggests that the DSM need to incorporate a dimensional perspective" (S. 257).

Dennoch täuschen diese dezidierten Worte nicht über den Umstand hinweg, dass es immer noch Diskrepanzen gibt. Diese betreffen insbesondere den Trait Offenheit als potentiellen fünften Faktor und einen allfälligen sechsten Faktor, der nicht durch die Basis-Domänen normaler Persönlichkeit erfasst wird. Drei Meta-Analysen zufolge ist Offenheit nur schwach mit pathologischer Persönlichkeits-Symptomatik assoziiert, und die zuvor genannten vier Traits würden ausreichen, um Persönlichkeitsstörungen auf einem übergeordneten Level adäquat zu beschreiben (O'Connor, 2005; Samuel & Widiger, 2008; Saulsman & Page, 2004). Demgegenüber argumentiert Blais (1997), dass Offenheit zusammen mit Gewissenhaftigkeit auf einen gemeinsamen Faktor lädt. Ein anderes Forschungsteam schlug eine alternative Taxonomie mit sechs Faktoren vor, welche nebst den Big Five Dimensionen noch einen Faktor „Eigenartigkeit" (englisch: oddity) enthält (Watson, Clark, & Chmielewski, 2008). Die Autoren argumentieren jedoch, dass Offenheit und Eigenartigkeit (bzw. Schizotypie oder Psychotizismus) im Vergleich zu den etablierten vier Faktoren einen eher eingeschränkten Geltungsbereich besitzen. Nichtsdestotrotz ist es wichtig, diesen Aspekt in zukünftigen Studien zu berücksichtigen, zumal auch andere Autoren Evidenz für einen Schizotypie-Faktor gefunden haben (z.B. Tackett, Silberschmidt, Krueger, & Sponheim, 2008).

Ganz aktuell gilt es insbesondere die Konzeption der „DSM-5 personality and personality disorder work group" hervorzuheben. Die Revision des DSM sieht fünf Faktoren pathologischer Persönlichkeit vor. Folgende Faktoren wurden vorgeschlagen: 1) Negative Affektivität, 2)

soziale Distanziertheit, 3) Feindseligkeit 4) Enthemmung (vs. Zwanghaftigkeit) und 5) Psychotizismus (Krueger, Derringer, Markon, Watson, & Skodol, 2012). Diesbezüglich scheint die Konzeptualisierung der Arbeitsgruppe einen Kompromiss früherer Arbeiten darzustellen. Definiert man Psychotizismus als extreme Variante von Offenheit (Widiger, 2011), ist die Übereinstimmung mit dem FFM zudem sehr hoch.

1.5.2. Aversive Kindheitserlebnisse: Die soziale Ebene

Das Themengebiet aversive Kindheitserlebnisse, besser bekannt unter der englischen Bezeichnung „Childhood Adversity“, umfasst eine Vielzahl von sozialen Risikofaktoren und präsentiert sich als sehr heterogenes Cluster. Aversive Kindheitserlebnisse sind für die Ätiopathologie von zentraler Bedeutung, da sie für die Entstehung und Symptomatik von Persönlichkeitsstörungen als äußerst wichtig erachtet werden (Battle et al., 2004; Johnson, Cohen, Brown, Smailes, & Bernstein, 1999; Johnson, Smailes, Cohen, Brown, & Bernstein, 2000; Luntz & Widom, 1994).

Studien in der Allgemeinbevölkerung konnten zeigen, dass Kindsmissbrauch mit nachfolgender Entwicklung von Persönlichkeitsstörungen und mit der Akzentuierung maladaptiver und dysfunktionaler Persönlichkeitsstrukturen assoziiert ist (Gibb, Wheeler, Alloy, & Abramson, 2001; Grover et al., 2007; Johnson et al., 1999; Miller & Lisak, 1999). In klinischen Stichproben hat die Mehrzahl der Patienten mit Persönlichkeitsstörungen eine Form des Kindsmissbrauchs erfahren. Der prozentuale Anteil ist über verschiedene Studien hinweg äußerst konsistent und beträgt ungefähr 75% (Battle et al., 2004; Bierer et al., 2003; Laporte & Guttman, 1996). Sexueller Missbrauch scheint zudem insbesondere mit der borderline Persönlichkeitsstörung (Battle et al., 2004; Johnson et al., 1999; Yen et al., 2002; Zanarini, 2000) und/oder mit der antisozialen Persönlichkeitsstörung (Battle et al., 2004; Bierer et al., 2003) assoziiert zu sein.

Für ein differenziertes und dezidiertes Bild der Ätiopathologie und Epidemiologie der Persönlichkeitsstörungen ist es jedoch wichtig, den Bezugsrahmen der aversiven Kindheitserlebnisse zu erweitern und auch überdauernde aversive Zustände wie Trennung der Eltern oder Armut zu berücksichtigen (Coid, 1999). Es existieren zahlreiche empirische Befunde, dass traumatischer Kindsmissbrauch gehäuft in spezifischen Risikopopulationen auftritt. Diese Risikopopulationen konstituieren sich als soziale Unterschichten, gekennzeichnet durch multiple individuelle, familiäre und sozioökonomische Probleme (Fergusson, Boden, & Horwood, 2008; Holzman, 1996; Rind & Tromovitch, 1997; Widom, Czaja, & Dutton, 2008). Zudem sind unterschiedliche aversive Kindheitserlebnisse eng miteinander verknüpft und Betroffene sind in der Regel gleich mehreren negativen Situationen ausgesetzt (Kessler, Davis, & Kendler, 1997). Aufgrund von Risikofaktoren wie Armut, tiefer Bildung oder Erziehungsproblemen sind Risikopopulationen darum unabhängig von Missbrauchserfahrungen bereits für die Entwicklung einer Persönlichkeitsstörung gefährdet. Folglich können genannte Faktoren sowohl Kindsmissbrauch als auch maladaptive Persönlichkeitsstrukturen begünstigen oder verursachen (Fergusson et al., 2008; Saleptsi et al., 2004).

In der Tat zeigen die wenigen Studien, welche nicht-traumatische aversive Kindheitserlebnisse erhoben haben, dass diese eng mit Persönlichkeitsstörungen assoziiert sind. Signifikante Zusammenhänge wurden gefunden für konfliktbehaftetes Schulklima (Kasen, Cohen, Chen, Johnson, & Crawford, 2009), frühe Trennung von der Mutter (Bandelow et al., 2005; Crawford, Cohen, Chen, Anglin, & Ehrensaft, 2009) oder mangelhafte Erziehung (Cohen et al., 2008). Eine der wenigen Studien, die eine Vielzahl von Risikofaktoren für alle Diagnosen der Persönlichkeitsstörungen untersuchte, fand in multiplen Regressionsmodellen, dass vor allem das Fehlen einer Erziehungsperson und Armut mit Persönlichkeitsstörungen assoziiert waren (Coid, 1999). Es gilt jedoch kritisch anzumerken, dass die Ergebnisse letzterer Studie basierend auf einer distinkten Stichprobe von Hochrisiko-Gefängnisinsassen ermittelt wurden, weswegen die externe Validität und Repräsentativität dieser Befunde eingeschränkt sind.

1.5.3. Kognitive Leistungsfähigkeit: Die biologische Ebene

Die kognitive Leistungsfähigkeit, auch als allgemeine Intelligenz bezeichnet, ist aufgrund ihrer hohen Erblichkeit von 70-80% (Deary, Penke, & Johnson, 2010) eine bedeutende biologische Determinante. Die allgemeine Intelligenz ist mit zahlreichen Achse I Störungen assoziiert (Breslau, Lucia, & Alvarado, 2006; MacCabe, 2008; Weiser et al., 2004) und könnte diesbezüglich auch ein wesentlicher Indikator der konstituierenden Psychopathologie der Persönlichkeitsstörungen darstellen. Es gibt jedoch nur wenige Studien, welche die kognitive Leistungsfähigkeit in Zusammenhang mit Persönlichkeitsstörungen untersucht haben. Dennoch finden sich in der Literatur konsistente Befunde, wonach eine allgemeine Persönlichkeits-Dysfunktion mit deutlich tieferen Intelligenz-Testwerten assoziiert ist (Burgess, 1992; Gale, Batty, Tynelius, Deary, & Rasmussen, 2010; Mortensen, Sorensen, Jensen, Reinisch, & Mednick, 2005; Weiser et al., 2004). An dieser Stelle wird bewusst der Terminus “allgemeine Dysfunktion” gebraucht, da alle zitierten Studien übergeordnete Störungskategorien aus aggregierten Diagnosen verwendet haben (das heißt, „Cluster B Persönlichkeitsstörungen“, „Schizophrenie-Spektrum Persönlichkeitsstörungen“ oder „jegliche Persönlichkeitsstörungen“).

Des Autors Wissen zufolge existieren in der neueren Literatur nur zwei Studien, welche spezifische Intelligenzwerte in Zusammenhang mit allen zehn DSM-IV Persönlichkeitsstörungen untersucht haben. Unsworth et al. (2009) fanden in einer Stichprobe von Hochschulstudenten, dass ausschließlich die schizotypische und die antisoziale Persönlichkeitsstörung signifikant mit tieferen Intelligenzwerten assoziiert waren. In einer anderen Untersuchung an Insassen aus Hochsicherheitsgefängnissen zeigte sich, dass die paranoide, antisoziale, borderline, vermeidende und abhängige Persönlichkeitsstörung mit tieferen Intelligenzquotienten assoziiert waren, wohingegen die narzisstische Persönlichkeitsstörung mit überdurchschnittlich hohem IQ assoziiert war (Coid, 1999). In beiden zitierten Studien wurden die Daten jedoch an sehr distinkten Sub-Populationen erhoben. Diese Stichproben unterscheiden sich in zahlreichen psychosozialen Determinanten von der Allgemeinbevölkerung. Die Repräsentativität und externe Validität der Ergebnisse muss deswegen abermals eher als gering eingeschätzt werden. Weitere Studien untersuchten zudem sozial-kognitive Fähigkeiten wie Empathie oder

emotionale Intelligenz, aber diese Arbeiten fokussierten ausschließlich auf die borderline (Arntz, Bernstein, Oorschot, & Schobre, 2009; Webb & McMurran, 2008) oder narzisstische Persönlichkeitsstörung (Ritter et al., 2011). Leider fehlen diesbezüglich Befunde zu den anderen Persönlichkeitsstörungen fast gänzlich.

Diese kurze Literaturübersicht zeigt deutlich, dass weitere Studien zum Zusammenhang zwischen kognitiver Leistungsfähigkeit und Persönlichkeitsstörungen notwendig sind um dieses Phänomen in der Allgemeinbevölkerung besser zu verstehen. Insbesondere sind multivariate statistische Modelle gefordert, welche die Kovarianz sowohl innerhalb als auch zwischen den unabhängigen und abhängigen Variablen berücksichtigen. Der jetzige Stand der Forschung ist zweifelsohne unbefriedigend.

2. ZIELE UND FRAGESTELLUNGEN

2.1. Ziele

Mit dieser Doktorarbeit soll ein umfassender Beitrag zur epidemiologischen Grundlagenforschung der Persönlichkeitsstörungen geschaffen werden. Übergeordnetes Ziel ist die Integration einer biologischen, psychologischen und sozialen Ebene, auf deren Grundlage konkrete ätiopathologische Prozesse abgebildet werden können. Der Fokus liegt dabei insbesondere auf wenig untersuchten Risikofaktoren im Kontext von Schule oder Familie und auf der kognitiven Leistungsfähigkeit als stark missachteten potentiellen Endophänotyp. Aufgrund der Einbeziehung und Berücksichtigung aller zehn DSM-IV Persönlichkeitsstörungen können auch Assoziationen mit spezifischen Persönlichkeitsstörungen betrachtet werden, welche in der Literatur bisher wenig Beachtung gefunden haben. Zudem soll im Hinblick auf die Revision der Diagnose-Manuale DSM und ICD die übergeordnete Struktur von normaler und pathologischer Persönlichkeit untersucht werden. Hierfür wird der konzeptuelle Vorschlag für DSM-5 sorgfältig evaluiert und validiert.

2.2. Fragestellungen

In Abhängigkeit der Studien werden schwerpunktmäßig folgende Fragestellungen untersucht:

Studie 1

1. Welche gemeinsame latente Faktorenstruktur weisen normale und pathologische Persönlichkeitseigenschaften auf?
2. Lassen sich die für DSM-5 vorgeschlagenen übergeordneten Dimensionen replizieren?

Studie 2

3. Welche sozialen Risikofaktoren der Persönlichkeitsstörungen sind in einem multivariaten Modell prädominant und bedeutsam?
4. Welche Risikofaktoren sind mit welchen Persönlichkeitsstörungen assoziiert? Gibt es charakteristische und spezifische Risikoprofile?

Studie 3

5. Ist die allgemeine kognitive Leistungsfähigkeit mit Persönlichkeitsstörungen assoziiert?
6. Sind spezifische Persönlichkeitsstörungen mit unterschiedlichen kognitiven Fähigkeiten assoziiert? Welche Zusammenhänge sind multivariat bedeutsam?

3. STUDIEN

3.1. STUDIE 1: The joint structure of normal and pathological personality: further evidence for a five-factor model

Michael P. Hengartner, Vladeta Ajdacic-Gross, Stephanie Rodgers, Mario Müller, Wulf Rössler

Abstract

Objective: The literature proposes a joint structure of normal and pathological personality with four to six higher-order factors based on the five-factor model of personality (FFM). The DSM-5 work group initially proposed five dimensions of pathological personality, namely negative affectivity, detachment, antagonism, disinhibition, and psychoticism. Recently that proposal was modified and ultimately dismissed by the DSM-5 taskforce. The purpose of the present study was to examine the joint structure of the FFM and the DSM-IV personality disorders and to compare this structure with the five dimensions initially proposed for DSM-5.

Methods: We applied a series of exploratory factor analyses on 511 subjects of the general population of Zurich, Switzerland, using data from the ZInEP Epidemiology Survey.

Results: The best fitting factor solution yielded a structure with five oblique rotated factors, which corresponded closely to the five personality traits initially proposed for DSM-5. All factors were consistently related to a particular FFM trait. Negative affectivity matched with neuroticism, detachment with extraversion (-), antagonism with agreeableness (-), disinhibition with conscientiousness (-), and psychoticism with openness. Associations with various socio-demographic and psychopathological covariates provided further convergent and discriminant validity.

Conclusions: We found strong evidence for the five traits initially proposed for DSM-5. Our findings support the notion of a personality continuum according to which personality disorder dimensions converge with normal personality traits. We conclude that the retention of the 10 dichotomous DSM-IV categories will prove wrong.

1. Introduction

Researchers agree that personality disorders (PDs) need a conceptual redefinition. The existing definition and operationalization of PDs lacks accuracy and adequacy [1-3]. The DSM-5 Research Planning Conference on Personality Disorders (held in December 2004, in Arlington, VA, USA) concluded that most PD symptoms occur on a continuum without any clear demarcations between disorder and normality. PDs seem, therefore, not to be discrete clinical conditions with distinct aetiologies, but rather distinctions along dimensions of general personality functioning, which suggests a redefinition of the categorical DSM-IV PDs [4].

The most established exponent of a dimensional approach is the PD conceptualization based on the five-factor model of personality (FFM), also known as the Big Five [5]. These five broad domains of general personality functioning are neuroticism, extraversion, openness, agreeableness, and conscientiousness. Originally, extensive data had indicated that there are four higher-order personality domains that underlie PD constructs, representing neuroticism (i.e. emotional dysregulation and negative affectivity), introversion (i.e. social withdrawal and detachment), disagreeableness (i.e. hostility and antagonism), and conscientiousness (i.e. compulsivity and constraint) [3,6-9].

According to three comprehensive meta-analyses examining the association between PDs and the FFM traits, openness is just faintly associated with PD symptomatology [10-12]. Those findings indicate that the four other FFM dimensions may suffice to describe PDs on a higher-order level appropriately, although Samuel and Widiger [11] acknowledge that a four-factor model risks being incomplete if schizotypal features were excluded. Additionally, Markon et al. [7] concluded that openness captures an important and unique source of information not covered by other higher-order domains, and a more recently published article even proposed an alternative taxonomy based on six factors [13]. In addition to the FFM traits these Big Six comprise the dimension oddity, which is considered to represent schizotypal personality features. A schizotypal factor has also been suggested by Tackett et al. [14], and it has been argued that oddity/schizotypy may represent a pathological variant of openness [15,16]. For a comprehensive review see Widiger [17].

The revision of the DSM-IV has been subject to controversial discussions [17,18]. Initially the DSM-5 personality and personality disorder work group indicated that the revised PD model will consist of the following five higher-order personality dimensions: 1) negative affectivity, 2) detachment, 3) antagonism, 4) disinhibition, and 5) psychoticism [19,20]. The five proposed personality domains therefore represented an integration of the well-described taxonomy of the four-factor models detailed above plus inclusion of psychoticism (aka oddity or schizotypy). Nevertheless, there was still an ongoing debate whether DSM-5 should incorporate the FFM itself instead of proposing different, rather newly conceived FFM-related traits [18,21]. After a subsequent modification of that proposal the DSM-5 taskforce ultimately dismissed the revision of the PDs. As a consequence the widely criticized categorization according to DSM-IV will persist in DSM-5.

Thus, the major objective of the present study was to examine the joint higher-order structure of normal and pathological personality with respect to the FFM and to compare those factors to the initial proposal of the DSM-5 personality and personality disorder work group by analyzing data from a population-based community sample. In a subsequent analysis we regressed those factors on socio-demographic and psychopathological covariates to show convergent and discriminant associations.

2. Methods

2.1. Study design and sampling

This study was conducted within the scope of the Epidemiology Survey of the "Zurich Programme for Sustainable Development of Mental Health Services" (ZInEP; in German: **Z**ürcher **I**mpulsprogramm zur **n**achhaltigen **E**ntwicklung der **P**sychiatrie), a research and health care programme involving several psychiatric research divisions and mental health services from the canton of Zurich, Switzerland. The Epidemiology Survey is one of the six ZInEP projects and consists of four components: 1) a short telephone screening, 2) a comprehensive semi-structured face-to-face interview followed by self-report questionnaires, 3) tests in the sociophysiological laboratory, and 4) a longitudinal survey (see Figure 1). Telephone screening

and semi-structured interviews started in August 2010, the tests at the sociophysiological laboratory in February 2011, and the longitudinal survey in April 2011. The screening ended in May 2012 and all other components in September 2012.

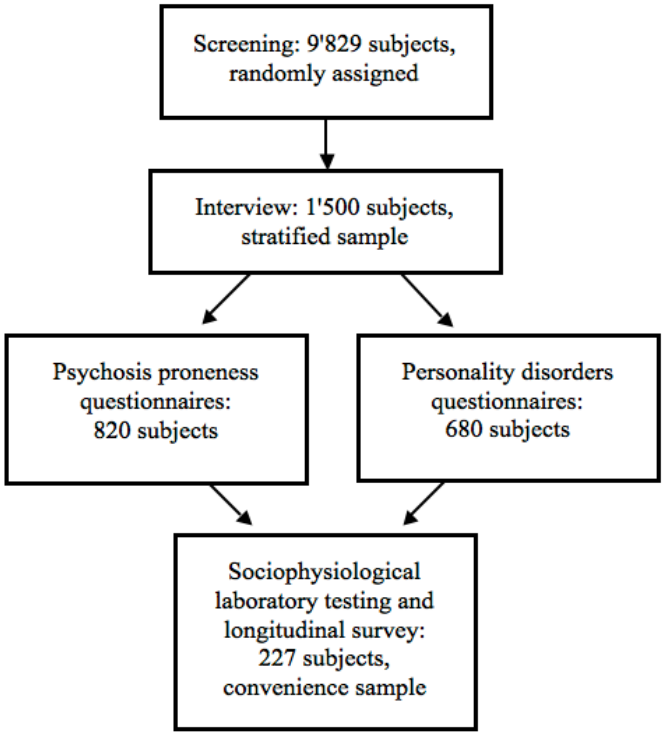

Figure 1: The sampling procedure of the ZInEP Epidemiology Survey

First, 9829 Swiss males and females aged 20-41 years at the onset of the survey and representative of the canton of Zurich, Switzerland, were screened by computer assisted telephone interview (CATI) using the SCL-27 [22]. All participants were randomly chosen through the residents' registration offices of all municipalities of the canton of Zurich. Residents without Swiss nationality were excluded from the study. The CATI was conducted by GfK (Growth for Knowledge), a major market and field research institute, in accordance with instructions from the ZInEP research team. The overall response rate was 53.6%. Reasons for non-response were no response, only telephone responder, incorrect telephone number, communication impossible, unavailability during the study period, and refusal by a third person

or the target person. In cases where potential subjects were available, the response rate was 73.9%.

Second, 1500 subjects were randomly selected from the initial screening sample for subsequent face-to-face interviews (response rate: 65.2%). We applied a stratifying sampling procedure including 60% high-scorers (scoring above the 75th percentile of the global severity index of the SCL-27) and 40% low-scorers (scoring below the 75th percentile of the global severity index). The basic sampling design was adapted from the prospective Zurich cohort study [23] and was chosen to enrich the sample with subjects at high-risk of mental disorders. Such a two-phase procedure with initial screening and subsequent comprehensive interview with a stratified subsample is fairly common in epidemiological research [24].

Face-to-face interviews were carried out by experienced and extensively trained clinical psychologists. The interviews took place either at the participants' homes or at the Zurich University Hospital of Psychiatry. All participants who completed the semi-structured interview were additionally assigned to complete various questionnaires. For this purpose, the sample was divided into subsamples focusing either on psychosis (N=820) or on personality disorders (N=680). Out of totally 680 subjects in the personality disorder subsample, 169 (24.9%) refused to return or complete all of the questionnaires required for the present study, leading to a final sample size of N=511.

The ZInEP Epidemiology Survey was approved by the Zurich State Ethical Committee to fulfil all legal and data privacy protection requirements and is in strict accordance with the declaration of Helsinki of the World Medical Association. All participants gave their written informed consent.

2.2. Instruments and measures

Personality disorder dimensions were provided by the Assessment of DSM-IV Personality Disorders Questionnaire (ADP-IV) [25]. The ADP-IV design allows a dimensional trait-score and a categorical PD diagnosis for each of the DSM-IV PD. The ADP-IV is a paper-pencil self-report instrument consisting of 94 items, which represent the 80 criteria of the 10 DSM-IV PD and the 14 research criteria of the depressive PD and the passive-aggressive PD. Each trait-question is

rated on a 7-point Likert scale, ranging from “totally disagree” to “totally agree”. For the present study we used the German translation by Doering et al. [26]. Internal consistency of the dimensional PD scales is good and test-retest reliability and concurrent validity of the dimensional trait-scores are also satisfactory [27]. Most importantly, the ADP-IV showed good concordance with the SCID-II interview [28] and may be considered an economical and valid alternative to semi-structured interviews.

The short form of the Schizotypal Personality Questionnaire (SPQ-B) [29] consists of 22 items, and measures three factors of schizotypy, namely “cognitive-perceptual” (e.g. paranoid ideation, illusionary perception), “interpersonal” (e.g. lack of close friends, social withdrawal), and “disorganized” (e.g. eccentric behaviour, odd mannerisms). Each one of the dichotomous items answered by a “yes” scores one point on the corresponding factor. Internal consistency and test-retest reliability of the subscales are high [30], and the three-factor structure has been replicated in several studies [31]. For the present study we used the German translation by Klein and colleagues [32]. The SPQ is considered to be an important instrument in assessing the personality domain “oddity”, which mirrors the Cluster A PD symptomatology and has been proposed as a distinct higher-order PD factor [13]. Furthermore, it has been argued that schizotypal features are underrepresented in the FFM, which was another rationale to include the SPQ in our analysis [15].

The Big Five Inventory short form (BFI-S) [33] is a German adaptation of the popular Big Five personality inventory by Costa and McCrae [5]. The questionnaire consists of 15 items divided into the five broad domains “neuroticism”, “extraversion”, “openness”, “agreeableness”, and “conscientiousness”. The items are rated on a 7-point Likert scale ranging from “don’t agree at all” to “completely agree”. The BFI-S has shown good reliability and validity [33].

2.3. Statistical analysis

Values on all FFM and PD dimensions were missing completely at random (MCAR) according to Little’s MCAR test (χ^2=319.114, df=311, p=0.363). Therefore, to obtain complete data from all 511 participants included in the analysis we conducted a missing value analysis (MVA) as

recommended by Schafer and Graham [34]. No variable was missing in more than maximally 16 cases (3.1%). MVA was carried out with the full information maximum likelihood estimation. Afterwards we conducted a series of exploratory factor analyses (EFA) using the principal component extraction method and oblique Oblimin rotation on an 18 x 18 item correlation matrix (comprising 10 ADP-IV scales, 5 BFI-S scales, and 3 SPQ-B scales). We computed separate models for 1 to 10 factors and determined the best fitting factor solution by inspecting Velicer's minimum average partial (MAP) test [35], Horn's parallel analysis (PA) test [36], the factor structure according to the guidelines provided by Costello and Osborne [37] as indicated below, the scree test [38], and the Kaiser criterion [39]. MAP and AP were conducted with syntax programmes provided by O'Connor [40]. Although we acknowledge that statistical tests are useful and appropriate tools we clearly advocate that only after a careful inspection of the factor structure researchers should determine the number of factors to retain. Such a decision is based on eigenvalues, communalities and factor loadings and is consequently theory-driven. A clean factor structure ideally comprises the following: that each factor loads on at least three items higher than 0.50, that each item should exhibit a loading of at least 0.32, and that only one factor should load higher than 0.32 on the same item (if two or more factors load higher than 0.32 on the same item is referred to as cross-loadings) [37]. Factor scores were computed according to the Bartlett method and used as dependent variables in subsequent simple linear regression analyses to examine associations with various covariates. All analyses were carried out with SPSS 20 for Macintosh.

3. Results

Both the MAP and PA test proved to be rather conservative and insensitive to subtle nuances in covariance patterns. Both tests clearly underestimated the number of meaningful factors. The MAP pointed towards a two-factor solution and the PA towards a three-factor solution. However, the two-factor and three factor solutions left an unacceptably high proportion of variance unexplained (47.4% and 41.2%, respectively). The two-factor solution delineated only a maladaptive factor (comprising positive loadings on neuroticism and all PD dimensions) from an

adaptive factor (comprising positive loadings on extraversion and openness and negative loadings on all PD dimensions). Furthermore, neither factor loaded on conscientiousness or agreeableness, thus leaving variance in those important traits unexplained (both h^2<0.100). The three-factor solution yielded an inconsistent and not interpretable pattern matrix with substantial cross-loadings in many items. Furthermore, the three factors did not sufficiently account for variance explained in neuroticism (h^2=0.232), which was deemed unacceptable.

Because of those shortcomings we chose to decide upon the number of factors to retain more data-related by inspecting the factor structure. The five-factor solution clearly showed the cleanest structure. Each item exhibited a factor loading >0.43, there were few and only weak factor cross-loadings, and every factor generated at least one high loading (>0.50) in combination with at least one significant loading (>0.32). The five-factor structure was also in accordance with the Kaiser criterion. This means that every extracted factor explains more variance than a single item would account for. The scree test additionally confirmed the five-factor structure: the plot shows that after factor 5 there is a bend: the curve flattens out and the further increase in variance explained by each additional factor is negligible (see Figure 2).

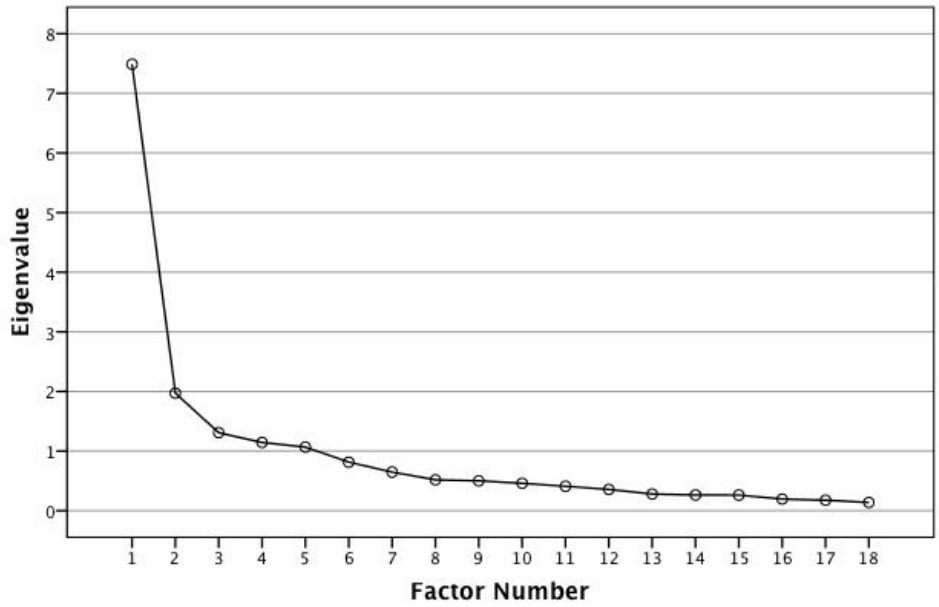

Figure 2: The scree plot of an exploratory factor analysis with 18 items

The first ten factors with their eigenvalues and percent of variance explained are shown in Table 1. The five-factor solution accounted for 72.1% of total variance explained (as opposed to 52.6% and 59.8% according to the two- and three-factor solution, respectively).

Table 1: Results of an exploratory factor analysis with 18 items: Initial eigenvalues and proportion of variance explained for the first 10 factors

	Eigenvalue	% Variance	% Cumulative Variance
Factor 1	7.489	41.603	41.603
Factor 2	1.972	10.953	52.556
Factor 3	1.308	7.268	59.824
Factor 4	1.145	6.360	66.184
Factor 5	1.067	5.928	72.111
Factor 6	0.814	4.524	76.636
Factor 7	0.648	3.599	80.234
Factor 8	0.517	2.871	83.105
Factor 9	0.500	2.779	85.885
Factor 10	0.460	2.555	88.440

The loadings of the 5 extracted factors on the 18 items are reported in Table 2. Factor 1 was characterised by high positive loadings on openness, cognitive-perceptual, disorganized, schizotypal, antisocial, and histrionic. Factor 2 was marked by a salient positive loading on extraversion and substantial negative loadings on interpersonal, schizoid, and avoidant. Factor 3 was characterised by a substantial positive loading on agreeableness and high negative loadings on paranoid, antisocial, and narcissistic. Factor 4 was marked by high positive loadings on neuroticism, borderline, histrionic, and dependent. Finally, factor 5 was characterised by two negative loadings on conscientiousness and obsessive-compulsive. The communalities measure the proportion of variance explained in each item accounted for by the five extracted factors. The results show that the five factors captured a high proportion of variance in all items (all $h^2>0.520$; mean $h^2=0.721$).

Associations between the 5 factors and various covariates are reported in Table 3. Factor scores were transformed in order to equalise high positive values with high impairment. Male sex was positively related to factors 2 and 3 and negatively to factors 4 and 5. Age was negatively associated with factors 3 and 4, but positively with factor 5. Tobacco use yielded positive associations with factors 1 and 3. Having children was negatively related to factor 1-4 and cohabiting/married to factors 1-3. Unemployed was uniquely positively associated with factors 1 and 2. Living alone yielded positive associations with factors 2, 4, and 5. Depressive symptoms were positively associated with all factors, but the effect was outstandingly high in factor 4. Finally, vegetative and anxiety symptoms were both related to factors 1-4 and demonstrated again intriguingly high effects in factor 4.

Table 2: Five-factor solution of an exploratory factor analysis: Oblimin rotated factor-loadings and communalities (h^2) of the ADP-IV, BFI-S and SPQ-B subscales. Factor-loadings greater 0.400 are indicated in bold.

Items	Fac. 1	Fac. 2	Fac. 3	Fac. 4	Fac. 5	h^2
BFI-S Neuroticism	–0.119	0.141	0.065	**0.959**	0.081	0.734
BFI-S Extraversion	0.274	**0.900**	–0.170	0.018	–0.212	0.742
BFI-S Openness	**0.854**	0.217	0.306	–0.058	0.061	0.683
BFI-S Conscientiousness	–0.190	0.134	0.189	–0.130	**–0.891**	0.850
BFI-S Agreeableness	0.180	–0.168	**0.913**	–0.011	–0.147	0.736
SPQ-B Cognitive-Perceptual	**0.511**	–0.032	–0.088	0.216	–0.175	0.528
SPQ-B Interpersonal	0.067	**–0.819**	0.126	0.074	–0.096	0.712
SPQ-B Disorganized	**0.588**	–0.395	0.016	0.063	0.129	0.606
ADP-IV Paranoid	0.130	–0.218	**–0.426**	0.267	–0.286	0.725
ADP-IV Schizoid	0.108	**–0.782**	–0.198	–0.301	–0.088	0.672
ADP-IV Schizotypal	**0.507**	–0.384	–0.192	0.130	–0.066	0.786
ADP-IV Antisocial	**0.601**	–0.076	**–0.432**	–0.062	0.153	0.667
ADP-IV Borderline	0.338	–0.084	–0.200	**0.562**	–0.061	0.803
ADP-IV Histrionic	**0.402**	0.134	–0.288	**0.519**	–0.039	0.725
ADP-IV Narcissistic	0.229	–0.139	**–0.533**	0.093	–0.330	0.733
ADP-IV Avoidant	0.080	**–0.752**	0.118	0.323	–0.004	0.848
ADP-IV Dependent	0.054	–0.349	0.057	**0.652**	–0.015	0.748
ADP-IV Obsessive-Compulsive	–0.031	–0.340	–0.218	0.299	**–0.432**	0.682

Table 3: Individual factor scores regressed on various covariates. Significant associations are indicated in bold.

Covariates	Fac. 1	Fac. 2	Fac. 3	Fac. 4	Fac. 5
	β	β	β	β	β
Male sex	0.080	**0.135****	**0.162****	**–0.200****	**–0.111***
Age	–0.059	–0.033	**–0.101***	**–0.104***	**0.122****
Tobacco use	**0.153****	–0.010	**0.120****	0.073	–0.019
Having children	**–0.105***	**–0.121****	**–0.110***	**–0.169****	0.031
Cohabiting/married	**–0.242****	**–0.224****	**–0.102***	–0.085	–0.045
Unemployed	**0.096***	**0.095***	0.027	0.058	0.000
Living alone	0.081	**0.121****	0.076	**0.104***	**0.131****
Depressive symptoms	**0.300****	**0.315****	**0.223****	**0.512****	**0.112***
Vegetative symptoms	**0.273****	**0.170****	**0.247****	**0.410****	0.068
Anxiety symptoms	**0.230****	**0.438****	**0.248****	**0.570****	0.075

* p<0.05 ** p<0.01

4. Discussion

We carried out a series of exploratory factor analyses with 18 continuous items comprising 10 DSM-IV PD dimensions, 5 FFM personality traits, and 3 schizotypal personality subscales in a community sample of 511 subjects. The solution with five Oblimin-rotated factors yielded the best model fit. Altogether the five factors explained 72.1% of total variance in joint normal and pathological personality dimensions. A five-factor structure similar to the one obtained in the present study has been reported previously [7,19,41,42]. Our empirically derived factor-structure excellently fits the five basic domains of normal personality. In our analysis the FFM personality traits were considerably and systematically associated with the DSM-IV PD dimensions as suggested by Widiger and Mullins-Sweatt [43]. Each factor loaded on a different Big Five trait, which is in accordance with a validation study by Stepp et al. [44]. Furthermore, and most importantly, our factor structure shows a close correspondence with the trait domains initially proposed for DSM-5 [19] and is in line with a preponderance of empirical research (for reviews see: [17,43,45]). The regression of the factor scores on various covariates revealed convergent and discriminant associations. Unfortunately the initial proposal for DSM-5 was subsequently modified into an untenable and flawed model based on the DSM-IV categories,

which conflicted with a preponderance of research evidence. As a consequence the DSM-5 taskforce ultimately dismissed that model and the DSM-IV categories will be retained in the upcoming diagnostic manual. In the following we briefly highlight our five extracted factors and discuss them in relation to the FFM and the dimensions initially proposed for DSM-5.

Factor 1 describes features of schizotypy such as illusionary perceptions, odd beliefs, eccentric behaviour and mannerism. The factor is strongly related to the Big Five domain openness and loads predominantly on schizotypal and antisocial PD. This finding is somewhat puzzling, considering that some studies assume openness is not related to PD symptomatology [12]. On the other hand, there are also many studies that have reported associations between PD symptomatology and openness [13,46-48] and it has been found that openness is associated with schizotypal features [15,49,50]. Thus, the factor closely corresponds to the trait "psychoticism" proposed for DSM-5 [19]. Factor 2 is characterised by social withdrawal, interpersonal functioning deficits and lack of close friends. The factor is substantially associated with schizoid and avoidant PD and converges with the FFM trait extraversion-introversion [10,11,46]. Furthermore, the factor closely resembles the trait "detachment" proposed for DSM-5 [19]. Factor 3 characterises aggressiveness, callousness, suspiciousness and self-importance. The factor is negatively associated with the Big Five trait agreeableness, which has been reported in previous studies [10-12]. In this respect factor 3 is a strong indicator of reckless and self-centred behaviours, for which reason it is associated with paranoid, antisocial, and narcissistic PD. The factor is consistent with the trait "antagonism" proposed for DSM-5 [19]. Factor 4 describes emotional instability and negative affectivity and is strongly associated with mood and anxiety disorder symptoms, which are predominant in borderline, histrionic, and dependent PD. The associations correspond to results that have previously been assigned to the FFM trait neuroticism [6,10,11,46]. The factor is consistent with the trait "negative affectivity" proposed for DSM-5 [19]. Finally, factor 5 describes features of rigidity and compulsivity at one pole, and disinhibition and negligence at the opposite pole along the continuum. The factor

showed a positive association with the Big Five trait conscientiousness as reported previously [11,12] and corresponds to the trait “disinhibition” as proposed for DSM-5 [19].

To conclude, we want to emphasize the significance of schizotypy and openness in the present study. Our data indicate that schizotypy (i.e. oddity or psychoticism) is involved in normal and pathological personality functioning. Inconsistencies in associations with openness are in part explained by findings from DeYoung and colleagues [51], which found that openness depicts an adaptive, intellectual feature and a maladaptive feature related to externalizing pathology. Furthermore, associations between the interpersonal SPQ-B subscales and the schizoid and avoidant PD dimensions [52] and associations between total SPQ scores and the FFM traits neuroticism and introversion [53] have been reported previously. However, very few studies have emphasized the importance of schizotypy in an integrative model of joint normal and pathological personality features. Watson et al. [13] suggested that the common four-factor models are incomplete and that they fail to describe schizotypal characteristics of the paranoid, schizoid, and schizotypal PD. This assumption is also expressed in the initial proposal of the DSM-5 personality and personality disorder work group, which defined psychoticism as a distinct dimension of pathological personality. Though our results suggest that schizotypal features and openness are associated, the former describes important features of PD dimensions that are not fully depicted through the FFM trait. As concluded by the DSM-5 personality and personality disorder work group, openness appears to be an incomplete measure of schizotypy [18]. We found support for associations of the Big Five domain openness with various PD dimensions. According to our findings and in line with other studies [49,50,54,55] openness is related to normal and pathological personality structure and not restricted to normal-range personality. However, we cannot derive from our data how strong and consistent the overlap between openness and psychoticism actually is. This is an important issue that we have to address in future research.

4.1. Limitations

This study is subject to the following limitations: First, we did not determine the number of factors according to two widely recognised statistical tests (MAP and PA), because we did not consider them as sensitive enough for small effects and subtle variation in covariance patterns. Second, we used short forms of the SPQ and of the Big Five Inventory. Although both instruments are validated, they do not assess all facets of the original forms. This may have slightly influenced our results. Third, our PD measures relied on a self-report questionnaire, which is critically appraised by some researchers.

4.2. Summary and conclusions

With regard to the revision of DSM and ICD, a dimensional PD concept is widely considered to be a marked improvement, providing greater validity and reliability than the current dichotomous categorical definition [1-3,56,57]. Thus we suggest that the retention of the 10 dichotomous DSM-IV PD categories in DSM-5 will prove wrong and detrimentally impact PD research in the future. In summary, we found further evidence for a common five-factor structure of normal and pathological personality as represented by associations between FFM traits, SPQ scales and PD dimensions. Thus our findings support the notion of a personality continuum on which PDs manifest themselves as extreme variants on normal personality traits. Our five extracted factors show close correspondence with the five traits initially proposed by the DSM-5 personality and personality disorder work group. Furthermore, each factor converged coherently with an FFM trait. Psychoticism appears to relate to normal and pathological personality, although the strength and consistency of the overlap between openness and schizotypy is still uncertain. Finally, our results challenge the decision to retain the 10 dichotomous DSM-IV PD categories in DSM-5 and advocate a dimensional model. Therefore we suggest that this study makes an important contribution to a more valid and appropriate definition and conceptualization of PDs.

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3.2. STUDIE 2: Childhood adversity in association with personality disorder dimensions: new findings in an old debate

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Abstract

Background: Various studies have reported a positive relationship between child maltreatment and personality disorders (PDs). However, few studies included all DSM-IV PDs and even fewer adjusted for other forms of childhood adversity, e.g. bullying or family problems.

Method: We analyzed questionnaires completed by 512 participants of the ZInEP epidemiology survey, a comprehensive psychiatric survey of the general population in Zurich, Switzerland. Associations between childhood adversity and PDs were analyzed bivariately via simple regression analyses and multivariately via multiple path analysis.

Results: The bivariate analyses revealed that all PD dimensions were significantly related to various forms of family and school problems as well as child abuse. In contrast, according to the multivariate analysis only school problems and emotional abuse were associated with various PDs. Poverty was uniquely associated with schizotypal PD, conflicts with parents with obsessive-compulsive PD, physical abuse with antisocial PD, and physical neglect with narcissistic PD. Sexual abuse was statistically significantly associated with schizotypal and borderline PD, but corresponding effect sizes were small.

Conclusion: Childhood adversity has a serious impact on PDs. Bullying and violence in schools and emotional abuse appear to be more salient markers of general personality pathology than other forms of childhood adversity. Associations with sexual abuse were negligible when adjusted for other forms of adversity.

1. Introduction

Child maltreatment is a major public health and social-welfare problem. According to a comprehensive study in high-income countries about 4-16% of children are physically abused, approximately 10% are neglected or emotionally abused, and 5-10% of girls and up to 5% of boys are sexually abused [22]. Adverse childhood experiences are supposed to be crucial with regard to the development and onset of personality disorders (PDs) [9,29,34].

In various longitudinal and cross-sectional community samples it has been found that child abuse or neglect was positively related to PDs [1,20,21,26,29,36]. The influence of child abuse and neglect on PD development has additionally been replicated in several clinical samples [9,13,23,33,50].

However, with regard to PD development it has been suggested that the framework of adverse childhood experiences be expanded beyond traumatic child abuse to include more long-term conditions such as parental divorce or poverty [15]. There is empirical evidence that traumatic child abuse and (re-) victimization particularly occur in specific populations from low social classes with multiple individual, familial, and socio-economic problems [28,39,48]. Independently of child maltreatment the same burdened populations may already be at high-risk for PD development because of factors such as poverty, low education level, parental separation, foster care, or drug abuse. Furthermore, childhood adversities are highly clustered and most individuals report exposure to multiple events [32]. Thus, social conditions may influence the probability of both child abuse and psychopathological symptoms [39].

Among other things it has been suggested that early separation from the mother predicts elevations in PD symptoms or even may cause PDs [3,7,17]. There is also evidence for an association between PD symptoms and adverse school climate [31]. Coid [15] reported several exposures to childhood adversities like parental loss, adoption, poverty, and foster-care to be predictors of different PD diagnoses. He concluded that the social and individual background may substantially predict PD development. However, it is mostly unknown whether different PD dimensions are associated with distinct or even specific forms of childhood adversity beyond child maltreatment. Furthermore, as Samuels stated in a recent review [41], there is still a need

for epidemiological studies of PD risk factors in the general population.

Thus, the major aim of the present study was to explore potential risk factors for different PD dimensions that have drawn little research attention so far. In addition to child maltreatment, we deliberately assessed a broad range of non-traumatic forms of adverse childhood experiences by examining environmental risk factors such as poverty, family and school problems, which are very common in Western societies, but often disregarded in PD research.

2. Materials and methods

2.1. Study design and sampling

The study was conducted within the scope of the epidemiology survey of the "Zurich Programme for the Sustainable Development of Mental Health Services" (ZInEP; in German: **Z**ürcher **I**mpulsprogramm zur **n**achhaltigen **E**ntwicklung der **P**sychiatrie), a research and health care programme involving several psychiatric research divisions and mental health services from the canton of Zurich, Switzerland. The epidemiology survey is one of the six ZInEP subprojects and consists of three components: 1) a short telephone screening, 2) a comprehensive semi-structured face-to-face interview followed by self-report questionnaires, 3) tests in the sociophysiological laboratory, and 4) a longitudinal survey (see Figure 1). Telephone screening and semi-structured interviews started in August 2010, the tests at the sociophysiological laboratory in February 2011, and the longitudinal survey in April 2011. The screening ended in May 2012 and all other components in September 2012.

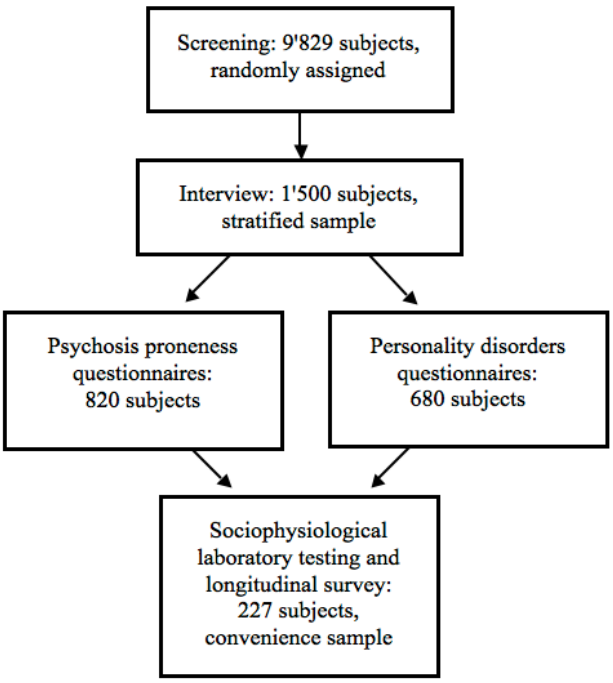

Figure 1: The sampling procedure of the ZInEP Epidemiology Survey

First, a total of 9'829 Swiss males and females aged 20-41 years at the onset of the survey and representative of the general population of the canton of Zurich, Switzerland, were screened by computer assisted telephone interview (CATI) using the Symptom Checklist-27 (SCL-27) [27]. All participants were randomly selected through the residents' registration offices of all municipalities of the canton of Zurich. Residents without Swiss nationality were excluded from the study. The CATI was conducted by GfK (Growth for Knowledge), a major market and field research institute, in accordance with instructions from the research team. The overall response rate was 53.6%. Reasons for non-response were no response, only telephone responder, incorrect telephone number, communication impossible, unavailability during the study period, or refusal by a third person or the target person itself. In cases where potential subjects were available, the response rate was 73.9%.

Second, 1500 subjects were randomly selected from the initial screening sample for subsequent face-to-face interviews (response rate: 65.2%). We applied a stratified sampling procedure including 60% high-scorers (scoring above the 75th percentile of the global severity index of the SCL-27) and 40% low-scorers (scoring below the 75th percentile of the global severity index).

The basic sampling design was adapted from the longitudinal Zurich cohort-study [4] and was chosen to enrich the sample with subjects at high-risk of mental disorders. Such a two-phase procedure with initial screening and subsequent interview with a stratified subsample is fairly common in epidemiological surveys [19].

Face-to-face interviews were conducted by experienced and extensively trained clinical psychologists. The interviews took place either at the participants' home or at the Psychiatric University Hospital in Zurich. All participants who completed the semi-structured interview were required to complete additional questionnaires. For this purpose, the sample was divided into subsamples focusing either on psychosis (N=820) or on PDs (N=680), respectively. Out of a total of 680 subjects in the PD subsample, 168 (24.7%) refused to return or to complete all questionnaires required for the present study, resulting in a reduced final sample size of N=512.

The ZInEP epidemiology survey was approved by the Zurich State Ethical Committee (KEK) to fulfil all legal and data privacy protection requirements and is in strict accordance with the declaration of Helsinki of the World Medical Association. All participants gave their written informed consent.

2.2. Instruments and measures

To assess dimensional PD scores we used the Assessment of DSM-IV Personality Disorders Questionnaire (ADP-IV) [42]. The ADP-IV design allows a dimensional trait-score and a categorical PD diagnosis for each of the DSM-IV PDs. The ADP-IV is a paper-pencil self-report instrument consisting of 94 items, which represent the 80 criteria of the 10 DSM-IV PDs and the 14 research criteria of the depressive and the passive-aggressive PD. Each trait-question is rated on a 7-point Likert scale, ranging from “totally disagree” to “totally agree”. The dimensional score of a given PD is computed by adding all scores of its respective items and by dividing this value by the number of items. For the present study we used a German translation by Doering et al. [18]. Internal consistency of the ADP-IV dimensional PD scales is good for the original Dutch version [44] and for the German adaptation [18] (median Cronbach’s α=0.77 and 0.76, respectively). Test-retest reliability and concurrent validity of the dimensional ADP-IV trait-

scores is also satisfactory [18,44]. Most importantly, the ADP-IV showed good concordance with the SCID-II interview [43] and may be considered as an economic and valid alternative to semi-structured interviews.

Child maltreatment was assessed with the Childhood Trauma Questionnaire (CTQ) [11]. The CTQ is a popular retrospective measure of child abuse and neglect. The short-form [12] consists of 28 items divided into a control-scale named *denial* and the 4 domains *emotional abuse*, *emotional neglect*, *sexual abuse*, *physical abuse* and *physical neglect*. The items are rated on a 5-point Likert scale ranging from “never true” to “very often true”. For the present study we applied a German adaptation [49]. Internal consistency of the different domains is high and test-retest reliability is also good. The CTQ showed good convergent and discriminant validity and can be considered to be a sensitive and valid screening questionnaire for child maltreatment [10,12,49].

Beside child maltreatment, childhood adversity was assessed with another self-report questionnaire that was designed by the authors following the schemes of the Zurich Study [4]. The questionnaire was divided into two sections, the first labelled *school problems* and the second *familial problems*. Every question referred to childhood and adolescence and was answered by the standard response options “yes” or “no”. Based on these data we defined six dichotomous outcome variables (absent vs. present) according to the following algorithms:

1) Bullying victimisation in school: if the respondent endorsed either “Were you often physically assaulted in school?”, “Were you frequently insulted in school?”, or “Were you regularly excluded and ignored in school?”.

2) Conduct problems in school: if either “Did you fight frequently in school?”, “Did your teacher frequently punish you?” or “Did you deliberately miss or skip school class a lot?”

3) Parents’ separation or divorce: if the item “My parents separated or divorced.” was endorsed.

4) Parents’ poverty: if the question “Sometimes we had hardly enough money to live.” was endorsed.

5) Conflicts with parents: if the respondent endorsed either “I was frequently punished by my parents.” or “My relationship with my parents was a constant up and down.”.

6) Parent’s substance abuse: if the question “Did your parents drink far too much alcohol?” or “Did your parents use illicit drugs?” was endorsed.

2.3. Statistical analysis

First, we analyzed the bivariate associations between every predictor variable and each dimensional PD trait-score by applying a series of generalized linear regression models (GLM). All dependent variables (i.e. PD dimensions) were right skewed; therefore we fitted models with gamma distribution and log-link function. A robust estimator was used to reduce the effects of outliers and influential observations. Results were reported with unstandardized beta coefficients (b) and standard errors (SE). The GLM were performed with SPSS version 20 for Macintosh. Second, we examined multivariate associations by fitting a multiple path analysis, where predictors were adjusted for each other and covariance between dependent variables was accounted for. Path analysis is a helpful tool used to minimize the unwanted effects of several interrelated predictor variables (multicollinearity) and correlated dependent variables (endogeneity). Each PD dimension was regressed on its bivariately significant predictors. Path coefficients were indicated with standardized beta coefficients (β) and standard errors (SE). To evaluate the goodness of model fit we considered the χ^2-test of model fit and the following approximate fit indices (AFI): the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). According to the χ^2-test a good fitting model should provide an insignificant result (i.e. above the 0.05 threshold) [8]. Recommended cut-off values of AFI for a good model fit are an CFI>0.95, an RMSEA<0.06, and an SRMR<0.08 [45]. Estimation of effect sizes relied on Cohen’s f^2, a formula for the interpretation of variance estimates [14]. The path analysis was conducted with Mplus Version 7 for Macintosh [37].

3. Results

Table 1: Descriptive statistics

Categorical measures	N	%
Female sex	284	55.5
Parents separated/divorced	100	19.5
Poverty	54	10.5
Conflicts with parents	198	38.7
Parental substance abuse	79	15.4
Victim of bullying	276	53.9
Conduct problems	156	30.5
Continuous measures	**Mean (SD)**	**Range**
Age	29.61 (6.74)	20-41
Emotional abuse	8.11 (3.86)	5-25
Emotional neglect	9.58 (4.53)	5-25
Physical abuse	5.79 (2.06)	5-24
Physical neglect	6.40 (2.11)	5-17
Sexual abuse	5.80 (2.60)	5-25

Descriptive statistics are reported in Table 1. The bivariate associations between childhood adversity and PD dimensions are shown in Table 2. Every PD dimension was associated with various childhood adversity variables. Poverty, conflicts with parents, bullying victimization, emotional abuse and neglect as well as physical abuse and neglect were significantly related to all 10 PDs. Parents separated or divorced was associated exclusively with schizotypal PD, whereas parental substance abuse was uniquely related to borderline and histrionic PD. Sexual abuse was significantly related to all PD dimensions except for schizoid, histrionic, and narcissistic PD. A continuous total adversity score was computed by adding the values of all childhood adversity variables. This total score was significantly associated with all PDs, which indicates a dose-response relationship. Additional analyses revealed that all significant associations corresponded to at least small effect sizes (all Pearson's $r>0.090$). Those

associations were thus all substantial and not merely a statistical artefact based on the large sample size.

The model fit of the path analysis was excellent. The χ^2 was 22.662 (df=21); p=0.362 (cut-off: p>0.05), the CFI was 0.999 (cut-off: >0.95), the RMSEA was 0.013 (cut-off: <0.06), and the SRMR was 0.016 (cut-off: <0.08). The path diagram is shown in Figure 2 and the results are reported in Table 3. There were three outstanding multivariate predictors of PD trait-scores, namely, bullying victimization and conduct problems in school, and emotional abuse. The latter was particularly strongly associated with schizotypal, borderline, histrionic, and avoidant PD (all β>0.200). Parents separated/divorced and parental substance abuse were not related to any PD dimension in the path analysis. Poverty was uniquely related to schizotypal PD, conflicts with parents to obsessive-compulsive PD, physical abuse to antisocial PD, and physical neglect to narcissistic PD. Sexual abuse was statistically significantly associated with schizotypal and borderline PD, but the corresponding effects sizes were small (both β<0.080). Considerably strong associations were found between antisocial PD and conduct problems (β=0.335) as well as between borderline PD and emotional abuse (β=0.285).

Childhood adversity accounted overall for a substantial proportion of variance explained in all 10 PD dimensions (see Table 4). Estimates of variance explained ranged from 9.0% for obsessive-compulsive PD (corresponding to f^2=0.10) to 27.8% for borderline PD (f^2=0.39) and 29.3% for schizotypal PD (f^2=0.41). According to Cohen's f^2 those variance estimates represent medium to large effect sizes (with f^2=0.02 denoting a small effect, f^2=0.15 a medium effect and f^2=0.35 a large effect).

Table 2: Results of a series of generalized linear models: Bivariate predictors of personality disorder dimensions. Statistically significant associations are indicated in bold (p<0.05). Continuous predictors were standardized using z-transformation.

	Personality Disorder Dimensions									
	PAR	SZ	ST	AS	BDL	HIS	NAR	AV	DEP	OC
Parents separated/divorced	0.040 (0.05)	0.029 (0.04)	**0.102 (0.05)**	0.040 (0.05)	0.077 (0.05)	0.033 (0.04)	0.028 (0.04)	-0.005 (0.05)	-0.035 (0.05)	0.021 (0.04)
Poverty	**0.235 (0.06)**	**0.153 (0.05)**	**0.327 (0.05)**	**0.142 (0.06)**	**0.272 (0.06)**	**0.163 (0.06)**	**0.142 (0.05)**	**0.225 (0.06)**	**0.152 (0.06)**	**0.120 (0.04)**
Conflicts with parents	**0.274 (0.04)**	**0.147 (0.03)**	**0.271 (0.04)**	**0.209 (0.04)**	**0.287 (0.04)**	**0.184 (0.03)**	**0.198 (0.03)**	**0.198 (0.04)**	**0.145 (0.04)**	**0.158 (0.03)**
Parental substance abuse	0.090 (0.05)	-0.011 (0.05)	0.060 (0.05)	0.091 (0.05)	**0.130 (0.05)**	**0.094 (0.05)**	0.069 (0.05)	0.029 (0.06)	0.035 (0.05)	0.023 (0.04)
Victim of bullying	**0.180 (0.04)**	**0.183 (0.03)**	**0.272 (0.04)**	**0.189 (0.04)**	**0.237 (0.04)**	**0.117 (0.03)**	**0.140 (0.03)**	**0.236 (0.04)**	**0.179 (0.04)**	**0.130 (0.03)**
Conduct problems	**0.216 (0.04)**	**0.171 (0.04)**	**0.235 (0.04)**	**0.361 (0.04)**	**0.221 (0.04)**	**0.158 (0.04)**	**0.181 (0.03)**	**0.130 (0.04)**	0.067 (0.04)	**0.075 (0.03)**
Emotional abuse	**0.156 (0.02)**	**0.099 (0.02)**	**0.182 (0.02)**	**0.131 (0.02)**	**0.200 (0.02)**	**0.118 (0.02)**	**0.098 (0.02)**	**0.159 (0.02)**	**0.121 (0.01)**	**0.081 (0.01)**
Emotional neglect	**0.158 (0.02)**	**0.101 (0.02)**	**0.173 (0.02)**	**0.126 (0.02)**	**0.187 (0.02)**	**0.105 (0.02)**	**0.101 (0.02)**	**0.161 (0.02)**	**0.113 (0.02)**	**0.074 (0.01)**
Physical abuse	**0.102 (0.01)**	**0.055 (0.01)**	**0.116 (0.01)**	**0.114 (0.02)**	**0.127 (0.02)**	**0.079 (0.01)**	**0.074 (0.01)**	**0.088 (0.02)**	**0.083 (0.01)**	**0.051 (0.01)**
Physical neglect	**0.113 (0.02)**	**0.066 (0.02)**	**0.129 (0.02)**	**0.102 (0.02)**	**0.141 (0.02)**	**0.085 (0.02)**	**0.095 (0.02)**	**0.102 (0.02)**	**0.077 (0.02)**	**0.054 (0.01)**
Sexual abuse	**0.048 (0.02)**	0.026 (0.02)	**0.081 (0.02)**	**0.058 (0.02)**	**0.087 (0.02)**	0.031 (0.02)	0.012 (0.01)	**0.051 (0.02)**	**0.051 (0.02)**	**0.031 (0.01)**
Total adversity score	**0.169 (0.02)**	**0.104 (0.02)**	**0.198 (0.02)**	**0.156 (0.02)**	**0.211 (0.02)**	**0.120 (0.02)**	**0.116 (0.02)**	**0.155 (0.02)**	**0.118 (0.02)**	**0.085 (0.01)**

PAR: Paranoid; SZ: Schizoid; ST: Schizotypal; AS: Antisocial; BDL: Borderline; HIS: Histrionic; NAR: Narcissistic; AV: Avoidant; DEP: Dependent; OC: Obsessive-Compulsive

Table 3: Results of a path analysis: Multivariate predictors of personality disorder dimensions. Statistically significant associations are indicated in bold ($p<0.05$).

	Personality Disorder Dimensions									
	PAR	SZ	ST	AS	BDL	HIS	NAR	AV	DEP	OC
Parents separated/divorced	–	–	0.042 (0.03)	–	–	–	–	–	–	–
Poverty	0.043 (0.04)	0.043 (0.05)	**0.118 (0.04)**	0.028 (0.04)	0.075 (0.04)	0.077 (0.05)	0.013 (0.05)	0.042 (0.05)	0.038 (0.05)	0.033 (0.05)
Conflicts with parents	0.085 (0.05)	0.046 (0.05)	0.044 (0.05)	0.037 (0.05)	0.031 (0.05)	0.059 (0.05)	0.098 (0.05)	-0.026 (0.05)	-0.014 (0.05)	**0.104 (0.05)**
Parental substance abuse	–	–	–	–	0.022 (0.03)	0.030 (0.03)	–	–	–	–
Victim of bullying	**0.088 (0.04)**	**0.164 (0.05)**	**0.171 (0.04)**	0.081 (0.04)	**0.105 (0.04)**	0.019 (0.05)	**0.090 (0.05)**	**0.159 (0.04)**	**0.142 (0.05)**	**0.114 (0.05)**
Conduct problems	**0.098 (0.04)**	**0.106 (0.04)**	**0.101 (0.04)**	**0.335 (0.04)**	**0.071 (0.03)**	**0.125 (0.04)**	**0.143 (0.04)**	0.011 (0.03)	–	0.028 (0.04)
Emotional abuse	**0.167 (0.07)**	0.056 (0.08)	**0.238 (0.07)**	0.054 (0.07)	**0.285 (0.07)**	**0.233 (0.07)**	0.062 (0.07)	**0.201 (0.07)**	**0.193 (0.07)**	0.119 (0.08)
Emotional neglect	**0.149 (0.07)**	0.135 (0.08)	0.060 (0.07)	0.053 (0.07)	0.064 (0.07)	-0.039 (0.08)	0.033 (0.08)	**0.164 (0.07)**	0.060 (0.08)	0.029 (0.08)
Physical abuse	0.034 (0.05)	-0.061 (0.05)	-0.017 (0.05)	**0.110 (0.05)**	0.001 (0.05)	0.005 (0.05)	0.002 (0.05)	-0.033 (0.05)	0.011 (0.06)	-0.066 (0.06)
Physical neglect	0.054 (0.05)	-0.005 (0.06)	0.047 (0.05)	-0.001 (0.05)	0.060 (0.05)	0.039 (0.06)	**0.128 (0.06)**	0.005 (0.05)	0.003 (0.06)	0.014 (0.06)
Sexual abuse	-0.037 (0.04)	–	**0.069 (0.03)**	0.017 (0.04)	**0.076 (0.03)**	–	–	-0.001 (0.04)	0.046 (0.04)	0.068 (0.04)

PAR: Paranoid; SZ: Schizoid; ST: Schizotypal; AS: Antisocial; BDL: Borderline; HIS: Histrionic; NAR: Narcissistic; AV: Avoidant; DEP: Dependent; OC: Obsessive-Compulsive

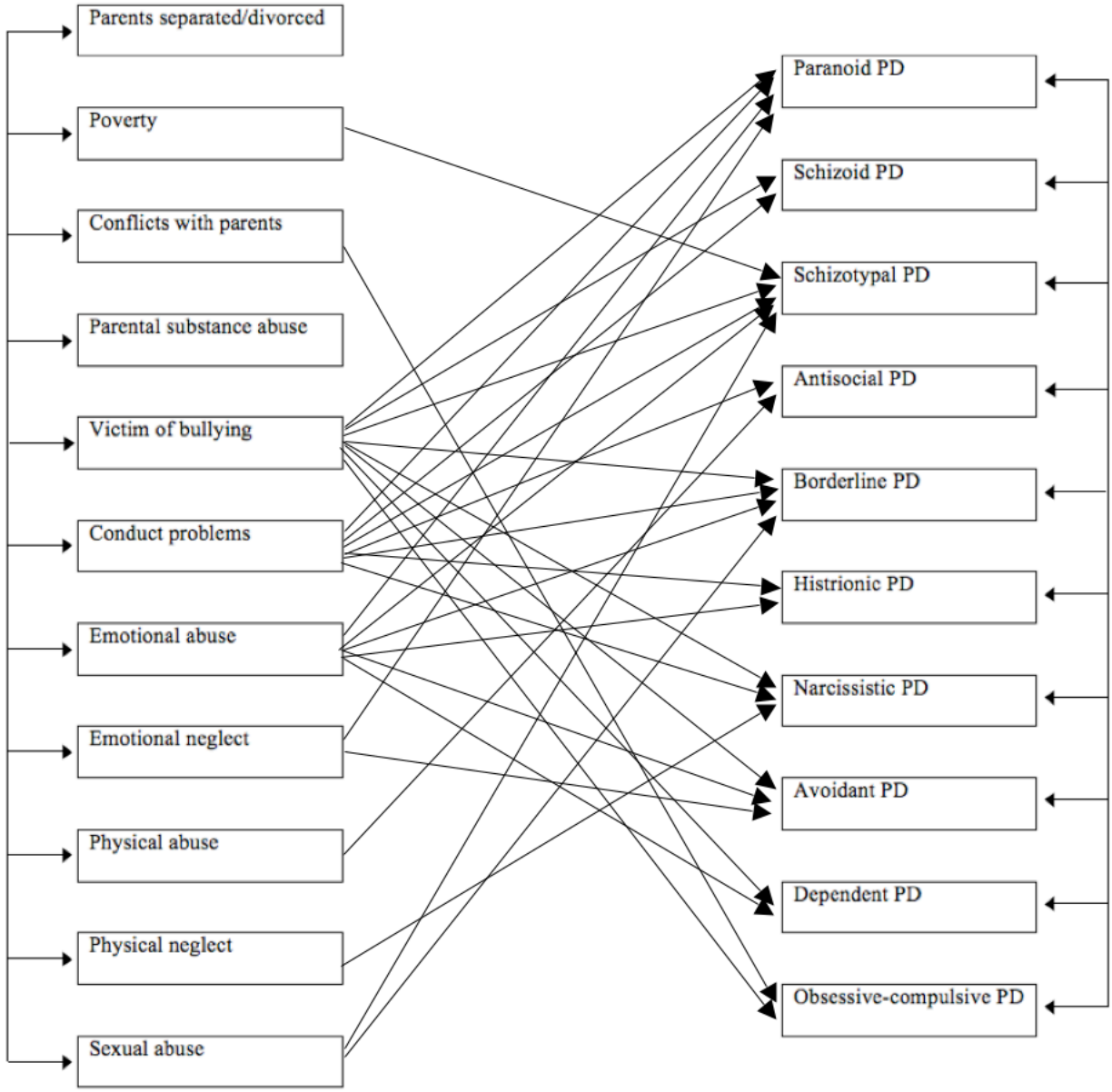

Figure 2: Results of a path analysis: Multivariate predictors of personality disorder dimensions. Only significant path coefficients are depicted ($p<0.05$).

Table 4: Proportion of variance explained (R^2) in personality disorder dimensions

PD dimension	Estimate (SE)	Significance
Paranoid	0.230 (0.034)	p<0.001
Schizoid	0.113 (0.027)	p<0.001
Schizotypal	0.293 (0.035)	p<0.001
Antisocial	0.232 (0.033)	p<0.001
Borderline	0.278 (0.035)	p<0.001
Histrionic	0.132 (0.028)	p<0.001
Narcissistic	0.135 (0.029)	p<0.001
Avoidant	0.166 (0.031)	p<0.001
Dependent	0.121 (0.028)	p<0.001
Obsessive-compulsive	0.090 (0.025)	p<0.001

4. Discussion

To the best of our knowledge, this is the first study to examine all 10 DSM-IV PDs in association with various forms of childhood adversity, including familial problems, school problems, and child maltreatment in a general population-based community sample. Overall, the findings show that childhood adversity is highly associated with PD symptomatology, explaining a large proportion of total variance. Furthermore, adding the scores of the various childhood adversity variables is associated with higher scores on every PD dimension, suggesting that childhood adversity impacts PDs in a dose-response relationship. In bivariate analyses poverty, conflicts with parents, being a victim of bullying in school, emotional abuse and neglect as well as physical abuse and neglect were significantly related to all 10 PD dimensions. In contrast to the bivariate analyses, the multivariate associations via path analysis indicated that only specific forms of childhood adversity were associated with various PD dimensions. Multivariate analyses allow more detailed conclusions and enable examination of the associations of a given form of childhood adversity when adjusted for others, which has rarely been done to date. Bullying victimization and conduct problems in school as well as emotional abuse were by far the strongest multivariate predictors, yielding significant associations with most PD dimensions. Relatively strong associations were found between antisocial PD and conduct problems as well

as between borderline PD and emotional abuse. Finally, sexual abuse showed no practical significance.

Our bivariate associations between child maltreatment and PD dimensions are in line with the literature [1,9,21,26,29], indicating that emotional and physical abuse and neglect are highly related to PDs. The examination of sexual abuse in persons with antisocial or borderline PD has a long tradition in PD research [51]. Many authors argue that sexual abuse is closely and/or specifically related to one of these PDs [9,13,29,38]. In our data sexual abuse was associated with all PD dimensions except for schizoid, histrionic, and narcissistic PD, although this finding applied only to the bivariate analyses. When controlled for other forms of childhood adversity, sexual abuse was uniquely associated with schizotypal and borderline PD. However, it is important to note that although these associations were statistically significant, they proved to be relatively weak. The magnitude of the corresponding effect size was not of practical significance. As emphasized by other authors [39], adjustment for the social context in which abuse occurs may drastically change the associations between child maltreatment and mental health outcomes. Rind and Tromovitch [39] state in their meta-analytic review that associations with psychological maladjustment disappear or become negligible in most community studies that adjusted sexual abuse for confounders such as emotional abuse or familial environment. Such findings illustrate the need for multivariate analyses of population-based samples that account for various forms of childhood adversity, including familial background and the social environment.

Our path analysis revealed that especially bullying victimization, conduct problems and emotional abuse were related to various PD dimensions. It thus appears that those forms of childhood adversity represent covariates of general personality dysfunction rather than of specific PD dimensions. Compared to emotional abuse, physical abuse and sexual abuse were much less related to PDs. This finding is consistent with previous studies, which found that in persons with PDs emotional abuse is much more prevalent than physical or sexual abuse

[9,13,40]. The estimates of variance explained were outstandingly high in borderline and schizotypal PD; thus it appears that childhood adversity plays a crucial role in those disorders. Conduct problems in school were considerably strongly related to antisocial PD, which is obvious given that conduct problems in childhood are a prerequisite criterion of antisocial PD [2]. Unlike other studies [15,32] poverty was uniquely related to schizotypal PD when adjusted for other childhood adversity variables. However, it has previously been shown that if parental care factors are statistically controlled for, the effect of poverty on child and adolescent developmental problems is considerably reduced [16,35]. Thus it appears that inclusion of various forms of childhood adversity as covariates outbalanced the effects of poverty in the present study.

In particular we want to emphasize the considerable impact of school problems on PD symptomatology. All 10 PD dimensions in the path analysis were significantly predicted by childhood adversity in the context of school (i.e. bullying victimization and/or conduct problems). Negative experiences in the school environment thus appear to be universal markers of general personality dysfunction, since they are associated with all PD dimensions. Because our cross-sectional design does not allow for causal conclusions we deliberately use the term marker, but recent prospective studies suggest that being a victim of constant bullying may constitute a causal risk factor for severe subsequent mental health problems such as antisocial PD and anxiety disorders [47], general internalizing problems [6] or psychotic symptoms [46]. To our knowledge there is only one prospective study that has focused on the relationship between school environment and PDs [31]. Adjusting for several covariates such as child maltreatment, socio-economic status and Axis I disorders, the authors found that a positive and supportive school climate resulted in subsequent PD symptom decreases, whereas a negative and conflictual school climate caused increases in PD symptoms. Early detection and prevention of school problems are therefore extremely important, since schools are key social contexts for shaping development and behaviours [31]. Furthermore, PDs may originate very early, that is, during late childhood or early adolescence [30], an age when most persons mainly spend their

time at school. In a recent review article on bullying victimization and mental health problems, the authors concluded that bullying contributes - independently of other factors - to the development and persistence of long-lasting severe mental health problems [5]. Nevertheless, further research, especially of a longitudinal nature, is needed to examine the interplay between school problems and early personality dysfunction in order to disentangle antecedents and consequences of PDs and to understand the aetiopathological process underlying this relationship.

The results of this study need to be interpreted in the context of the following limitations: First, because of the cross-sectional design the assessment of childhood adversity was necessarily retrospective. Thus we were not able to determine a clear temporal order and accordingly cannot draw causal conclusions from our data. Second, a serious limitation of self-report instruments may be a recall bias, suggesting that subjects tend to under-report or deny traumatic events. Nevertheless, the reliability of self-reports of victimization is satisfactory in both subjects with mental disorders [25] and subjects without mental disorders [24]. It has also been found that official state registry records and self-reports of child abuse show good correspondence [29]. Furthermore, only a few studies [e.g. 29,34] have used official records from a public authority registry to analyse associations between child abuse and PDs; most have used retrospective self-report questionnaires. Thus this is a general limitation of research on childhood adversity. Third, our measures of familial environment relied on simple dichotomous items (i.e. present vs. absent) without consideration of severity and frequency and PD measures were assessed by self-report questionnaire. Validity and reliability of those measures may thus be restricted.

5. Conclusion

In this study we outline the importance of child maltreatment and certain forms of non-traumatic childhood adversity in association with PDs that have been disregarded for a long time. In this respect we suggest that schools in particular may be a crucial environment in which PD

symptoms become apparent or accentuated and which may also contribute to PD development. Bullying and violence in school as well as emotional abuse may play a major role in the aetiopathology of PDs. By contrast, sexual abuse appears to be of negligible practical significance when adjusted for other forms of adversity. We suggest that prevention and intervention programmes that are nested within the context of family and school might be further explored for their appropriateness for PD symptomatology. Furthermore, longitudinal studies that focus on the aetiopathology of PDs are needed.

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3.3. STUDIE 3: Cognitive abilities and personality disorder dimensions: exploring the link

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Abstract

Background: There is some evidence that fluid intelligence as well as empathy may be significantly related to personality disorders (PDs). To our knowledge no study has addressed those issues simultaneously in all 10 DSM-IV PD dimensions in a sample of the general population. **Methods:** We analyzed data from 196 participants aged 20-41 from the epidemiology survey of the Zurich Programme for Sustainable Development of Mental Health Services (ZInEP), a comprehensive psychiatric survey in the general population of the canton of Zurich, Switzerland. We assessed the digit symbol-coding test (DSCT), the "reading the mind in the eyes"-test (RMET) and the interpersonal reactivity index (IRI). **Results:** Both measures of cognitive empathy (i.e. RMET and IRI-perspective-taking) were not related to any PD dimension, neither in bivariate nor in multivariate analyses. Most PD dimensions were multivariately associated with low DSCT scores, low scores on IRI-empathic-concern, and high scores on IRI-personal-distress. The portion of variance explained by cognitive abilities ranged from a small effect size for antisocial PD to a large effect size for avoidant PD. In most PD dimensions the total variance explained represented medium to large effects. **Conclusions:** General PD symptomatology is related to low fluid intelligence and reduced emotional empathy as characterized by low empathic concern and high personal distress towards emotional expressions of others. We hypothesize that neurobiological dysfunctions predominantly located in the prefrontal cortex are responsible for this association and contend that reduced cognitive abilities are an important risk factor for a general psychopathological vulnerability.

Introduction

Studies focusing on associations between personality disorders (PDs) and different cognitive abilities in the general population are rare. Furthermore, there is still an ongoing debate as to how such relationships might be interpreted (Gale *et al.* 2010). Several recent longitudinal studies reported an association between premorbid intelligence and increased risk of hospital admission for a PD (Gale *et al.* 2010; *Moran et al.* 2009; Mortensen *et al.* 2005). Findings from a cross-sectional male adolescent community study provides strong evidence that low general intelligence is not solely restricted to psychiatric hospitalization, but also to increased PD prevalence (Weiser *et al.* 2004). Coid (1999) found that paranoid, antisocial, borderline, avoidant and dependant PDs were associated with low general intelligence, whereas narcissistic PD was related to above-average intelligence. However, the external validity of the latter study is limited since the sample consisted of inmates from maximum-security prisons. Finally, testing a sample of university students and using dimensional PD scores, Unsworth *et al.* (2009) found modest negative correlations for schizotypal and antisocial PDs with fluid intelligence, whereas associations for all other PD dimensions failed to reach significance.

Studies of cognitive abilities in borderline patients have a long tradition. More recently, research on borderline PD has focused on empathy. Empathy is a multi-facet construct with substantial overlap with related concepts, which in turn are not clearly differentiated (Haker *et al.* 2010). Altogether those concepts form cluster of social cognitive abilities that encompass empathy, emotional intelligence, and theory of mind (ToM). Here we focus on the concepts of cognitive empathy and emotional empathy (Blair, 2005). Cognitive empathy is consistent with ToM, that is, a subject's ability to understand the mental states that underlie other people's manifest behaviours and facial expressions. Emotional empathy describes one's emotional reaction towards other people's affective states. However, with respect to borderline PD findings are inconsistent. While some studies have reported associations between borderline symptomatology and reduced empathy/emotional intelligence/ToM (Dziobek *et al.* 2011; Gardner & Qualter, 2009; Hertel *et al.* 2009), others have failed to find a relationship (Arntz *et al.* 2009; Beblo *et al.* 2010; Webb & McMurran, 2008). Hagenmuller *et al.* (2012) found reduced

cognitive and emotional empathy scores in psychopathic antisocial subjects and another study suggests that also narcissistic PD may be associated with reduced emotional empathy, but not with cognitive empathy (Ritter *et al.* 2011). However, there is no data available on other PD dimensions and studies in community samples are lacking.

To the best of our knowledge no study has ever examined differential cognitive abilities in association with all DSM-IV PD dimensions in a population-based community sample. Thus, the objective of the present study was to fill this gap and to examine indicators of fluid intelligence and measures of empathy in association with dimensional scores of all ten DSM-IV PDs.

Methods

Study design and sampling

This study was conducted within the scope of the epidemiology survey of the Zurich Programme for Sustainable Development of Mental Health Services (ZInEP; in German: "**Z**ürcher **I**mpulsprogramm zur **n**achhaltigen **E**ntwicklung der **P**sychiatrie"), a research and health care programme involving several psychiatric research divisions and mental health services of the canton of Zurich, Switzerland. The epidemiology survey is one of the six ZInEP subprojects and consists of four components: 1) a short telephone screening, 2) a comprehensive semi-structured face-to-face interview followed by self-report questionnaires, 3) tests in the sociophysiological laboratory, and 4) a longitudinal survey (see Figure 1). Telephone screening and semi-structured interviews started in August 2010, the tests at the sociophysiological laboratory in February 2011, and the longitudinal survey in April 2011. The screening ended in May 2012 and all other components in September 2012.

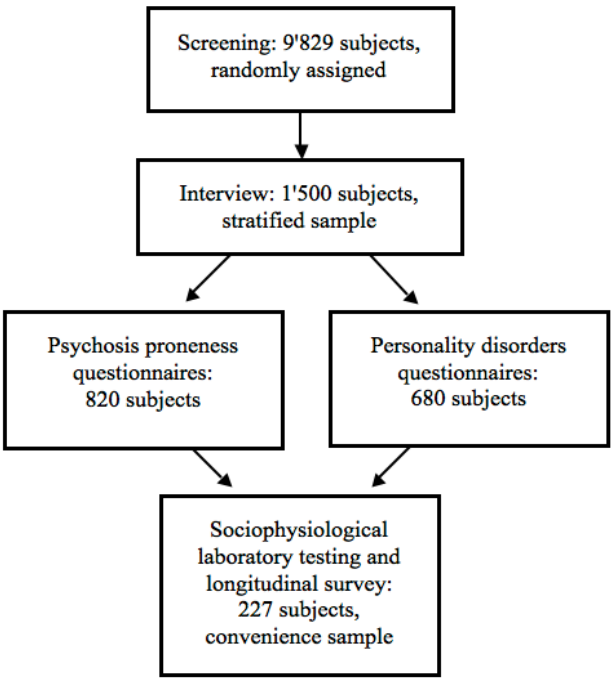

Figure 1: The sampling procedure of the ZInEP Epidemiology Survey

First, 9829 Swiss males and females aged 20-41 years at the onset of the survey, representative of the canton of Zurich, Switzerland, were screened by computer assisted telephone interview (CATI) using the Symptom Checklist-27 (SCL-27) (Hardt *et al.* 2004). All participants were randomly chosen through the residents' registration offices of all municipalities of the canton of Zurich. Residents without Swiss nationality were excluded from the study. The CATI was conducted by GfK (Growth for Knowledge), a major market and field research institute, in accordance with instructions from the ZInEP research team. The overall response rate was 53.6%. Reasons for non-response were no response, only telephone responder, incorrect telephone number, communication impossible, unavailability during the study period or refusal by a third person or the target person. In cases where potential subjects were available the response rate was 73.9%.

Second, 1500 subjects were randomly selected from the initial screening sample for subsequent face-to-face interviews (response rate: 65.2%). We applied a stratifying sampling procedure including 60% high-scorers (scoring above the 75th percentile of the global severity index of the SCL-27) and 40% low-scorers (scoring below the 75th percentile of the global severity index).

The basic sampling design was adapted from the prospective Zurich cohort study (Angst *et al.* 2005) and was chosen to enrich the sample with subjects at high-risk for mental disorders. Such a two-phase procedure with initial screening and subsequent comprehensive interview with a stratified subsample is fairly common in epidemiological research (Dunn *et al.* 1999).

Face-to-face interviews were carried out by experienced and extensively trained clinical psychologists. The interviews took place either at the participants' homes or at the Psychiatric University Hospital in Zurich. All participants who completed the semi-structured interview were additionally assigned to complete various questionnaires. For this purpose, the sample was divided into subsamples focusing either on psychosis (N=820) or on personality disorders (N=680).

Third, for the longitudinal survey 227 subjects from the two subsamples were selected. Participants initially assigned to the psychosis subsample additionally completed the PD questionnaires. All subjects first performed a set of neuropsychological tests and were subsequently interviewed at 2-month time intervals over a maximum period of 6 months with a brief telephone-screening. The neuropsychological tests were conducted in the laboratory of the Psychiatric University Hospital of Zurich. Subjects who participated in the laboratory testing and the longitudinal survey additionally received a 100 CHF payout in cash to recompense their time and effort. For the present study we included 196 participants who completed the questionnaires related to personality disorders and who provided all required data from the neuropsychological testing.

The ZInEP Epidemiology Survey was approved by the Zurich State Ethical Committee as fulfilling all legal and data privacy protection requirements and is in strict accordance with the declaration of Helsinki of the World Medical Association. All participants gave their written informed consent.

Instruments and measures

The Assessment of DSM-IV Personality Disorders Questionnaire (ADP-IV) (Schotte & de Doncker, 1994) provides a dimensional trait-score and a categorical PD diagnosis for each of

the DSM-IV PD and higher-order PD clusters A, B, or C. The ADP-IV is a paper-pencil self-report instrument consisting of 94 items representing the 80 criteria of the 10 DSM-IV PDs and the 14 research criteria of the depressive PD and the passive-aggressive PD. Each trait-question is rated on a 7-point Likert scale, ranging from “totally disagree” to “totally agree”. For the present study we used the German translation by Doering *et al.* (2007). Internal consistency and test-retest reliability of the dimensional trait-scores is good and concurrent validity is also satisfactory (Doering *et al.* 2007; Schotte *et al.* 1998). Most importantly, the ADP-IV showed good concordance with the SCID-II interview (Schotte *et al.* 2004) and may be considered as an economic and valid alternative to semi-structured interviews.

The digit symbol-coding test (DSCT) is a subtest of the well-established Wechsler Adult Intelligence Scale, third Edition (WAIS-III) (Wechsler, 1997). It serves as a screening instrument for neuropsychological dysfunction and is predominantly associated with information processing speed (Joy *et al.* 2004), whereas processing speed is substantially associated with fluid intelligence (Jung & Haier, 2007). The task of the test is to write down the right numbers allocated to various symbols. The test ends after 120 seconds and the test score is calculated by adding all symbols that have been correctly coded within the 120 seconds. Reliability and validity of the DSCT are good (Gonzalez-Blanch *et al.* 2011; Joy *et al.* 2004).

The “reading the mind in the eyes”-test (RMET) measures a subject’s ability to put him- or herself in someone else’s mental state and to deduce emotions and intentions by looking at their eyes (Baron-Cohen *et al.* 2001). This ability is regarded as a major component of ToM and is referred to as social cognition or mentalizing and is consistent with the concept of cognitive empathy. Thus, in the following we refer to the RMET as an indicator of cognitive empathy. The revised version of the RMET test consists of 36 pictures of eye-pairs. Every picture is presented with 4 response items that may describe the mental state of the person on the picture. The participants have to indicate which term best describes what the person in the picture is thinking or feeling. For every right answer the participant receives a point. There is no time limitation. The reliability and validity of the test is good (Baron-Cohen *et al.* 2001; Hallerback *et al.* 2009).

The interpersonal reactivity index (IRI) (Davis, 1980) is a self-rating questionnaire that consists of four subscales with 7 items each that assess different aspects of empathy. The IRI captures one's ability and need to empathize with mental states. Each item is evaluated on a 5-point Likert scale ranging from 1 ("does not describe me well") to 5 ("describes me very well"). The "perspective-taking" subscale (IRI-PT) measures the ability to comprehend other people's perspective. IRI-PT is accordingly a measure of cognitive empathy. The second subscale – "fantasy" (IRI-FS) – assesses the tendency to put oneself into a fictitious character. IRI-FS was not included in the analysis because we considered its face validity to be insufficient and the concept of the subscale to be irrelevant for the aims of this study. The "empathic concern" subscale (IRI-EC) detects the willingness to feel compassion and concern for other people and the fourth subscale – "personal distress" (IRI-PD) – covers a person's self-oriented negative feelings in reaction to others' emotional expression. Both IRI-EC and IRI-PD assess emotional empathy. The IRI has shown good reliability and validity (Davis, 1983; Fernandez *et al.* 2011).

Statistical analysis

First, we analyzed the bivariate associations between every predictor variable and each dimensional PD trait-score by applying series of generalized linear regression models (GLM). All dependent variables (i.e. PD dimensions) were right skewed, therefore we fitted models with a gamma distribution and log-link function. A robust estimator was used to reduce the effects of outliers and influential observations. The REMT, DSCT and IRI subscales were entered separately as predictor variables. Results were reported with unstandardized regression coefficients (b) and their 95% Wald confidence intervals (95% CI). The GLM were performed with SPSS version 20 for Macintosh. Second, we examined multivariate associations by implementing multiple path analysis, where predictors are adjusted for each other and covariance between dependent variables is accounted for. Thus path analysis is a helpful tool in minimizing the unwanted effects of several interrelated predictor variables (multicollinearity) and correlated dependent variables (endogeneity). We fitted a recursive (i.e. unidirectional) and saturated model. A saturated path analysis is a multiple regression model that perfectly fits the

data because it computes all variances and co-variances of the variables included in the model (i.e. there are as many parameters as there are values to be fitted). We applied a robust mean and variance adjusted maximum likelihood estimator (MLMV). MLMV has been recommended because of its robustness to multivariate non-normality of continuous data (Brown, 2006). The model is shown in Figure 2. Path coefficients are indicated with standardized regression coefficients (β) and their standard errors (SE). Estimation of effect sizes relied on Cohen's f^2, a formula for the interpretation of variance estimates (Cohen, 1988). The path analysis was conducted with Mplus Version 7 for Macintosh (Muthén & Muthén, 1998-2012).

Results

The results of the bivariate analyses are reported in Table 1. No significant associations were found for RMET and IRI-PT. DSCT was significantly and negatively associated with schizoid (b=–0.067), schizotypal (b=–0.063), and borderline PD (b=–0.081). IRI-EC was significantly negatively related to paranoid (b=–0.062), schizoid (b=–0.098), antisocial (b=–0.094) and narcissistic PD (b=–0.100). Finally IRI-PD was significantly positively related to paranoid (b=0.111), schizotypal (b=0.108), borderline (b=0.147), histrionic (b=0.077), avoidant (b=0.207), dependent (b=0.166), and obsessive-compulsive PD (b=0.109).

The results of the multivariate analysis are indicated in Table 2; for a graphic illustration see Figure 2. RMET and IRI-PT were also multivariately not related to any PD dimension. Paranoid (β=–0.153), schizoid (β=–0.190), schizotypal (β=–0.169), borderline (β=–0.193), avoidant (β=–0.130) and obsessive-compulsive PD (β=–0.142) were all negatively associated with DSCT. Significant negative associations with IRI-EC were found for paranoid (β=–0.246), schizoid (β=–0.365), schizotypal (β=–0.220), antisocial (β=–0.238), narcissistic (β=–0.324), and avoidant PD (β=–0.245). All PD dimensions except for antisocial PD were positively related to IRI-PD ($0.183<\beta>0.527$). Interestingly, the same pattern characterized by negative associations with DSCT and IRI-EC and a positive one with IRI-PD was found for paranoid, schizoid, schizotypal, and avoidant PD.

Table 1: Results of a series of generalized linear models: Bivariate associations between PD dimensions and measures of fluid intelligence (DSCT), cognitive empathy (RMET and IRI-PT), and emotional empathy (IRI-EC and IRI-PD)

	DSCT	**RMET**	**IRI-EC**	**IRI-PD**	**IRI-PT**
	b (SE)	b (95% CI)	b (95% CI)	b (95% CI)	b (95% CI)
Paranoid	–0.046 (0.028)	0.010 (0.029)	**–0.062 (0.029)***	**0.111 (0.025)****	–0.031 (0.027)
Schizoid	**–0.067 (0.025)****	–0.029 (0.028)	**–0.098 (0.024)****	0.049 (0.028)	–0.019 (0.022)
Schizotypal	**–0.063 (0.030)***	–0.004 (0.029)	–0.039 (0.031)	**0.108 (0.029)****	0.007 (0.027)
Antisocial	–0.030 (0.030)	–0.021 (0.030)	**–0.094 (0.029)****	–0.013 (0.041)	–0.033 (0.027)
Borderline	**–0.081 (0.032)****	–0.009 (0.030)	0.011 (0.033)	**0.147 (0.029)****	–0.040 (0.028)
Histrionic	–0.008 (0.029)	0.025 (0.028)	–0.020 (0.028)	**0.077 (0.027)****	–0.030 (0.025)
Narcissistic	–0.036 (0.026)	0.004 (0.027)	**–0.100 (0.027)****	0.037 (0.027)	–0.041 (0.024)
Avoidant	–0.035 (0.030)	0.048 (0.033)	–0.055 (0.032)	**0.207 (0.025)****	–0.037 (0.029)
Dependent	–0.023 (0.029)	0.017 (0.028)	0.014 (0.026)	**0.166 (0.023)****	–0.028 (0.024)
Obsessive-compulsive	–0.030 (0.024)	0.035 (0.025)	–0.025 (0.023)	**0.109 (0.021)****	–0.037 (0.023)

*p<0.05 **p<0.01

DSCT: Digit symbol-coding test; RMET: Reading the mind in the eye test; IRI: Interpersonal reactivity index; IRI-EC: Empathic concern; IRI-PD: Personal distress; IRI-PT: Perspective-taking

Table 2: Results of the path analysis: Multivariate associations between PD dimensions and measures of fluid intelligence (DSCT), cognitive empathy (RMET and IRI-PT), and emotional empathy (IRI-EC and IRI-PD).

	DSCT	**RMET**	**IRI-EC**	**IRI-PD**	**IRI-PT**
	β (SE)	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)
Paranoid	**–0.153 (0.061)***	0.034 (0.075)	**–0.246 (0.068)****	**0.353 (0.070)****	–0.007 (0.064)
Schizoid	**–0.190 (0.066)****	–0.065 (0.080)	**–0.365 (0.066)****	**0.233 (0.075)****	0.069 (0.063)
Schizotypal	**–0.169 (0.068)***	0.009 (0.069)	**–0.220 (0.074)****	**0.326 (0.069)****	0.078 (0.067)
Antisocial	–0.065 (0.066)	–0.045 (0.071)	**–0.238 (0.080)****	0.028 (0.103)	0.010 (0.067)
Borderline	**–0.193 (0.069)****	–0.006 (0.068)	–0.041 (0.076)	**0.392 (0.069)****	–0.101 (0.069)
Histrionic	–0.047 (0.072)	0.056 (0.075)	–0.086 (0.080)	**0.231 (0.073)****	–0.062 (0.071)
Narcissistic	–0.123 (0.067)	0.016 (0.071)	**–0.324 (0.071)****	**0.182 (0.076)***	–0.006 (0.067)
Avoidant	**–0.130 (0.057)***	0.097 (0.064)	**–0.245 (0.070)****	**0.524 (0.055)****	–0.021 (0.073)
Dependent	–0.094 (0.066)	0.032 (0.071)	–0.046 (0.072)	**0.479 (0.062)****	–0.082 (0.073)
Obsessive-compulsive	**–0.142 (0.063)***	0.114 (0.066)	–0.138 (0.074)	**0.393 (0.070)****	–0.095 (0.074)

*p<0.05 **p<0.01

DSCT: Digit symbol-coding test; RMET: Reading the mind in the eye test; IRI: Interpersonal reactivity index; IRI-EC: Empathic concern; IRI-PD: Personal distress; IRI-PT: Perspective-taking

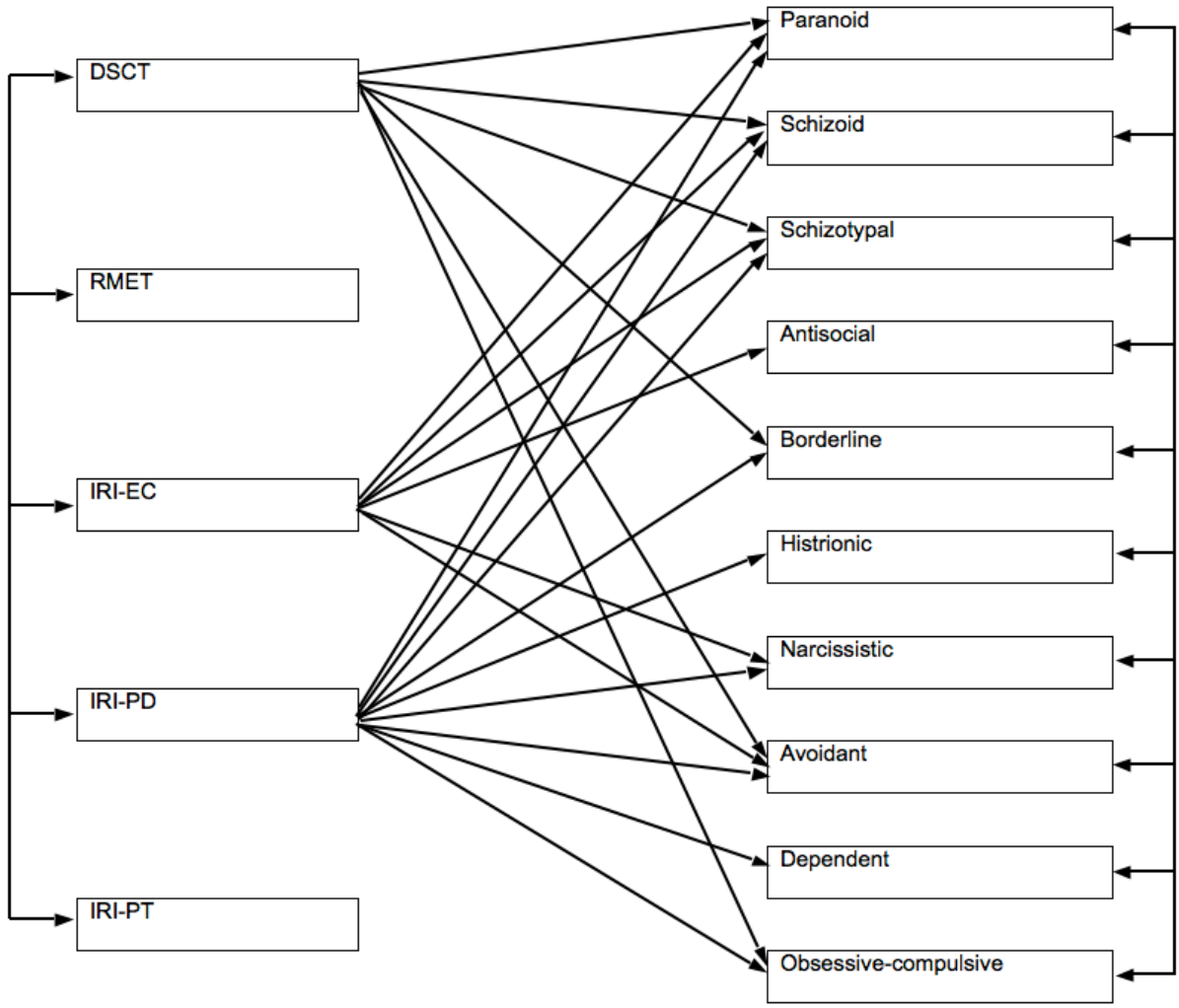

Figure 2: Graphic illustration of the path analysis: Multivariate associations between PD dimensions and measures of fluid intelligence (DSCT), cognitive empathy (RMET and IRI-PT), and emotional empathy (IRI-EC and IRI-PD).

DSCT: Digit symbol-coding test; RMET: Reading the mind in the eye test; IRI: Interpersonal reactivity index; IRI-EC: Empathic concern; IRI-PD: Personal distress; IRI-PT: Perspective-taking

The proportion of variance explained by the path analysis is indicated in Table 3. Proportion of variance explained ranged from 5.8% for antisocial PD to 30.0% for avoidant PD. Those estimates correspond to Cohen's f^2 of 0.06 and 0.43, representing a small and a large effect size. Most estimates of variance explained were of medium to large effect size and the mean effect was f^2=0.20 (with f^2=0.02 denoting a small effect, f^2=0.15 a medium effect and f^2=0.35 a large effect).

Table 3: Results of the path analysis: Proportion of variance explained (R^2) in personality disorder dimensions

PD dimension	R^2 (SE)	f^2	Significance
Paranoid	0.163 (0.052)	0.195	p=0.002
Schizoid	0.167 (0.049)	0.200	p=0.001
Schizotypal	0.138 (0.046)	0.160	p=0.003
Antisocial	0.058 (0.032)	0.062	p=0.075
Borderline	0.188 (0.055)	0.232	p=0.001
Histrionic	0.064 (0.035)	0.068	p=0.071
Narcissistic	0.122 (0.051)	0.139	p=0.017
Avoidant	0.300 (0.052)	0.429	p<0.001
Dependent	0.234 (0.054)	0.305	p<0.001
Obsessive-compulsive	0.191 (0.055)	0.236	p=0.001

Discussion

This is the first study to examine all ten DSM-IV PD dimensions in association with measures of fluid intelligence and empathy in a population-based community sample. Bivariate analyses revealed that all PD dimensions were negatively associated with processing speed, although the regression coefficients were statistically significant only for schizoid, schizotypal, and borderline PDs. Processing speed is an important indicator of fluid intelligence (Jung & Haier, 2007). Reduced general and fluid intelligence in borderline PD (Coid, 1999) and schizotypal PD (Unsworth *et al.* 2009; Venables & Raine, 2012) has been reported previously. Both measures of cognitive empathy, that is, the RMET and IRI-PT, were not significantly related to any PD dimension. Research in social cognitive abilities has almost exclusively focused on borderline

PD. In this respect our results are consistent with several studies that did not find a significant association between cognitive empathy/emotional intelligence/ToM and borderline PD (Arntz *et al.* 2009; Beblo *et al.* 2010; Webb & McMurran, 2008). In line with Ritter *et al*. (2011) we found that narcissistic PD was unrelated to cognitive empathy, but significantly negatively related to emotional empathy. In our bivariate analyses, all PD dimensions were significantly associated with either low empathic concern (paranoid, schizoid, antisocial, and narcissistic PD) or high empathic personal distress (paranoid, schizotypal, borderline, histrionic, avoidant, dependent, and obsessive-compulsive PD). Unfortunately we are not aware of other studies that included such a comprehensive assessment of empathy in all DSM-IV PDs. The associations reported here are nevertheless well captured and explained through specific criteria of those respective PDs in DSM-IV-TR (American Psychiatric Association, 2000). For instance, schizoid PD is characterized by high indifference towards and detachment from emotional relations, which is well displayed by the negative association with empathic concern. Avoidant PD symptoms comprise fear of criticism and rejection; thus, as expected, this PD dimension was positively related to empathic personal distress.

Adjusting measures of fluid intelligence and empathy for each other and accounting for the covariance between PD dimensions using multiple path analysis revealed that fluid intelligence was negatively associated with all PD dimensions except for antisocial, histrionic, narcissistic, and dependent PD. This finding is mostly in line with the literature on general intelligence (Coid, 1999; Gale *et al.* 2010; Mortensen *et al.* 2005; Weiser *et al.* 2004). However, in contrast to Coid (1999), in our data narcissistic PD was not associated with higher intelligence scores, but rather with lower fluid intelligence (although statistically not significant at α=0.05). Furthermore, we found no significant association for either antisocial or dependent PD. Since the study by Coid (1999) measured PDs and full-scale general intelligence in imprisoned high-risk offenders, we suggest that this discrepancy could be ascribed to specific characteristics of this distinct sub-population or to the more comprehensive measure of general intelligence that was applied in that study. Again, in the present study both measures of cognitive empathy were not multivariately associated with any PD dimension either. In contrast, personal distress as an

indicator of emotional empathy was strongly associated with all PD dimensions except for antisocial PD, which was expected because of the callous nature of antisocial subjects (Hagenmuller *et al.* 2012). And finally, empathic concern as the other indicator of emotional empathy was significantly negatively related to paranoid, schizoid, schizotypal, antisocial, narcissistic, and avoidant PD, which captures well the symptoms of aloofness and interpersonal detachment in those disorders (American Psychiatric Association, 2000). Taken together our multivariate analysis showed that general PD symptomatology is consistently related to low fluid intelligence and reduced emotional empathy as characterized by low empathic concern in conjunction with personal distress towards the emotional expressions of others. Interestingly, we found no significant association with cognitive empathy (i.e. ToM) as measured by the "reading the mind in the eyes"-test. The rather low proportion of variance explained in antisocial and histrionic PD suggests that those dimensions are just slightly associated with cognitive abilities and that they are better explained by other factors such as childhood adversity (Hengartner *et al.*, submitted).

From an evolutionary perspective it has been argued that intelligence is the driving force of humans' ability to control and manipulate their environment (Geary, 2005; Sherwood *et al.* 2008). Thus, a complex and rapidly changing (social) environment demands an appropriate cognitive performance. An individual with impaired cognitive abilities is likely to fail when it comes to coping with critical life events and adapting successfully to changing environments. Failure to master the social environment and its demands may cause interpersonal stress and predispose to disorders of social interaction, notably personality disorders. As a result, intelligence also regulates to some extent the development of personality (Ackerman & Heggestad, 1997; Austin *et al.* 2002).

We hypothesize that the common aetiopathological foundations of PDs and low cognitive abilities are of structural (e.g. gray matter volume) and functional (e.g. hypoactivity) character, particularly in areas of the prefrontal cortex. This assumption is supported by studies showing that the multiple demand brain activity underlying general and especially fluid intelligence is

substantially related to areas of the prefrontal cortex (Colom *et al.* 2009; Geake & Hansen, 2005; Shaw *et al.* 2006; Woolgar *et al.* 2010). Emotional intelligence, empathy and theory of mind are among others similarly associated with the prefrontal cortex (Ferstl & von Cramon, 2002; McCabe *et al.* 2001; Vollm *et al.* 2006). And finally, there is a growing body of evidence indicating that neurobiological aberrations located in the prefrontal cortex and its neuronal connections to the limbic system and the basal nuclei are likewise associated with PDs and PD symptoms such as emotional dysregulation, aggressiveness, or impulsivity (Anderson *et al.* 2006; Dolan & Park, 2002; Goyer *et al.* 1994; Hazlett *et al.* 2005; McCloskey *et al.* 2005; Narayan *et al.* 2007; Raine *et al.* 2000; Schmahl & Bremner, 2006; Sundram *et al.* 2012; Yang & Raine, 2009). However, one should note that almost all findings refer to antisocial and borderline PD; thus it is uncertain if those associations also apply to other PDs. The frontal lobe is presumably the most prominent and most profoundly investigated area that is reciprocally related to intelligence and PDs. Nevertheless, there are also other brain areas involved in cognitive functions, and intelligence does not reside in a single constricted brain region like the frontal lobe (Colom *et al.* 2009). For an extensive review of cognitive abilities and brain activity see Jung and Haier (2007).

Low intelligence is not specifically related to PDs. Several authors have concluded that psychiatric disorders in general are associated with at least mild cognitive impairment and that the IQ score has no specificity among different diagnoses (Mortensen *et al.* 2005; Weiser *et al.* 2004; Zammit *et al.* 2004). For instance, prospective longitudinal studies have found that low premorbid IQ is associated with increased risk of schizophrenia (Koenen *et al.* 2009; MacCabe, 2008), severe depression (Gale *et al.* 2008; Koenen *et al.* 2009; Zammit *et al.* 2004), or post-traumatic stress disorder (Breslau *et al.* 2006; Gale *et al.* 2008; Kremen *et al.* 2007). Therefore, based on the current literature and in accordance with the “cognitive reserve” hypothesis (Barnett *et al.* 2006) we suggest that low cognitive abilities constitute a causal risk factor involved in the aetiopathology of a general vulnerability to mental disorders, and not specifically to PDs. Such a general vulnerability could include the higher-order factors internalizing and

externalizing problems (Krueger, 1999). In this respect it has recently been shown that externalizing problems are associated with low general intelligence (DeYoung *et al.* 2008).

This study is subject to the following limitations: First, because of the cross-sectional design we cannot draw causal conclusions from our data. Second, we assessed only one single measure of fluid intelligence. A more extensive test battery may have yielded further or more differentiated associations. Third, the RME is possibly too narrowly reduced to eye expression to capture general interindividual differences in cognitive empathy in subjects with PD symptoms. Here, a test that measures cognitive empathy in more complex social interactions would have presumably provided more valid data. Fourth, because our participants were included through a convenience sample, the representativeness and external validity of our results may be restricted.

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4. DISKUSSION

4.1. Zusammenfassung der Studien

4.1.1. Ergebnisse der Studie 1

In Studie 1 wurden die gemeinsamen Strukturen analysiert, welche sowohl Persönlichkeitsstörungen als auch normalen Persönlichkeitseigenschaften zugrunde liegen. Hiefür wurden adaptive und maladaptive Persönlichkeitseigenschaften in faktorenanalytischen Modellen auf ihre gemeinsamen übergeordneten latenten Faktoren untersucht. Wichtigste Zielsetzung war die Validierung des Vorschlages einer dimensionalen Konzeption der DSM-5 Arbeitsgruppe. Die Lösung mit der besten Modell-Passung ergab eine Struktur mit fünf schiefwinklig rotierten Faktoren. Im Folgenden werden die fünf extrahierten Komponenten kurz beschrieben:

Der erste Faktor stimmte mit der DSM-5 Dimension „Psychotizismus“ überein und lud hoch auf die Skalen „Offenheit“, „kognitiv-perzeptuelle Störung“, „Desorganisiertheit“, „schizotypisch“, „antisozial“ und „histrionisch“. Der zweite Faktor konvergierte mit der DSM-5 Dimension „Soziale Distanziertheit“ und konstituierte sich durch starke Ladungen auf die Skalen „Extraversion“, „interpersonelle Defizite“, „schizoid“ und „vermeidend“. Der dritte Faktor konvergierte mit der DSM-5 Dimension „Feindseligkeit“ und wurde charakterisiert durch Ladungen auf die Skalen „Verträglichkeit“, „paranoid“, „antisozial“ und „narzisstisch“. Der vierte Faktor entsprach der DSM-5 Dimension „negative Affektivität“ und wurde gekennzeichnet durch hohe Ladungen auf die Skalen „Neurotizismus“, „borderline“, „histrionisch“ und „zwanghaft“. Der fünfte Faktor entsprach der DSM-5 Dimension „Enthemmung“ und wurde bestimmt durch hohe Faktorladungen auf die Skalen „Gewissenhaftigkeit“ und “zwanghaft“.

Ähnliche Strukturen mit fünf Faktoren wurden in der Literatur schon mehrfach berichtet (z.B. Harkness, McNulty, & Ben-Porath, 1995; Markon, Krueger, & Watson, 2005; Nestadt et al., 2006) und die Befunde sind konsistent mit der dimensionalen Konzeptionen der Persönlichkeitsstörungen (Clark, 2007; Widiger, Livesley, & Clark, 2009). Am wichtigsten ist

jedoch die hohe Überschneidung mit dem konzeptuellen Vorschlag der DSM-5 Arbeitsgruppe (Krueger et al., 2012) und die hohe Passung mit den Traits des FFM (Widiger, 2011).

4.1.2. Ergebnisse der Studie 2

Die Studie 2 untersuchte unterschiedliche Formen von aversiven Kindheitserlebnissen im Zusammenhang mit Persönlichkeitsstörungen. Das Konzept Childhood Adversity bezeichnet eine Vielzahl von aversiven Umwelteinflüssen im Kind- und Jugendalter. Unter diese Definition fallen zeitlich begrenzte, episodische Erlebnisse wie sexueller oder körperlicher Missbrauch, aber auch situationsübergreifende und längerfristige Zustände wie Armut, elterliche Vernachlässigung oder Schikanierung und Ausgrenzung in der Schule. Die statistische Modellierung beinhaltete in einem ersten Schritt bivariate Regressionsmodelle. In einem zweiten Schritt wurden alle Prädiktoren mittels einer multiplen Pfadanalyse multivariat geprüft.

In den bivariaten Modellen zeigte sich, dass Armut, elterliche Konflikte, Schikanierung und Verhaltensprobleme in der Schule, sowie emotionaler und physischer Missbrauch und Vernachlässigung signifikant mit allen Persönlichkeitsstörungen assoziiert waren. Elterlicher Alkohol- oder Drogen-Missbrauch war ausschließlich mit der borderline und der histrionischen Persönlichkeitsstörung verknüpft, während Scheidung oder Trennung der Eltern einzig mit der schizotypischen Persönlichkeitsstörung in Zusammenhang stand. Die Ergebnisse der multivariaten Analyse zeigten, dass nur Schikanierung und Verhaltensprobleme in der Schule sowie emotionaler Missbrauch mit einer Vielzahl von Persönlichkeitsstörungen assoziiert waren. Armut war ausschließlich mit der schizotypischen Persönlichkeitsstörung, elterliche Konflikte mit der zwanghaften Persönlichkeitsstörung, physischer Missbrauch mit der antisozialen Persönlichkeitsstörung, und physische Vernachlässigung mit der narzisstischen Persönlichkeitsstörung assoziiert. Sexueller Missbrauch war statistisch signifikant mit der schizotypischen und der borderline Persönlichkeitsstörung verknüpft, der Zusammenhang war jedoch schwach und nicht bedeutungsvoll.

Diese Befunde sind weitgehend konsistent mit der Literatur (Johnson et al., 1999; Kasen et al., 2009; Sourander et al., 2007). Sexueller Missbrauch scheint in der Allgemeinbevölkerung multivariat weit weniger relevant zu sein, als klinische Studien vermuten lassen. Dies deckt sich mit einer Meta-Analyse von Rind und Tromovitch (1997). Demgegenüber scheinen aversive Erlebnisse im Umfeld der Schule und emotionaler Missbrauch bedeutende Risikofaktoren für eine allgemeine und dimensionsübergreifende Persönlichkeitspathologie darzustellen. Die Varianzaufklärung reichte von 9% für die zwanghafte Persönlichkeitsstörung bis ca. 30% für die borderline und die schizotypische Persönlichkeitsstörung. Childhood Adversity konstituiert sich demzufolge insbesondere im Zusammenhang mit der schizotypischen und der borderline Persönlichkeitsstörung als sehr bedeutender Risikofaktor.

4.1.3. Ergebnisse der Studie 3

In Studie 3 wurden Persönlichkeitsstörungen in Verbindung mit dem kognitiven Leistungsvermögen untersucht. Hierfür wurden drei distinkte Fähigkeiten geprüft: Informationsverarbeitungs-Geschwindigkeit als Indikator der fluiden Intelligenz, kognitive Empathie – auch als Theory of Mind bezeichnet – und emotionale Empathie. Abermals wurden im Anschluss an bivariate Regressionsanalysen mittels Pfadanalyse die multivariaten Zusammenhänge untersucht.

Die bivariaten Analysen zeigten, dass die fluide Intelligenz signifikant negativ mit der schizoiden, der schizotypischen, und der borderline Persönlichkeitsstörung assoziiert war. Demgegenüber offenbarte die kognitive Empathie keine signifikanten Zusammenhänge mit jeglichen Störungsdimensionen. Maße der emotionalen Empathie waren signifikant mit allen zehn DSM-IV Persönlichkeitsstörung assoziiert. Die Zusammenhänge zeigten auf, dass Persönlichkeitsstörungen entweder mit erhöhter persönlicher empathischer Belastung oder reduzierter empathischer Betroffenheit konvergierten. Von besonderem Interesse sind die multivariaten Zusammenhänge mittels multipler Pfadanalyse, da nur multivariate Verfahren gleichzeitig die Kovarianz innerhalb der verschiedenen Prädiktoren (d.h. der kognitiven

Fähigkeiten) und innerhalb der Kriterien (d.h. der zehn Störungsdimensionen) berücksichtigen. Die Ergebnisse verdeutlichen, dass fluide Intelligenz und emotionale Empathie eine übergeordnete und bedeutende Rolle spielen. Niedrige fluide Intelligenz war signifikant mit allen Störungsdimensionen außer der antisozialen, histrionischen, narzisstischen und abhängigen Persönlichkeitsstörung assoziiert. Reduzierte emotionale Empathie war wiederum mit allen zehn Persönlichkeitsstörungen assoziiert. Die Varianzaufklärung reichte von 6% für die antisoziale Persönlichkeitsstörung bis zu 30% für die vermeidende Persönlichkeitsstörung.

Es fällt schwer diese Ergebnisse im Kontext früherer Arbeiten einzuordnen, da keine vergleichbaren Studien existieren, die fluide Intelligenz und Empathie im Zusammenhang mit allen DSM-IV Persönlichkeitsstörungen in der Allgemeinbevölkerung untersucht haben. Nichtsdestotrotz konnten verschiedene Studien aufzeigen, dass Persönlichkeitsstörungen mit signifikant tieferen fluiden Intelligenzwerten assoziiert sind (Coid, 1999; Gale et al, 2010; Weiser et al., 2004). Bezüglich Empathie fehlen aufschlussreiche Studien fast gänzlich. Zwar existieren einzelne Studien, die ebenfalls keinen Zusammenhang zwischen kognitiver Empathie und der borderline (z.B.: Arntz et al., 2009; Webb & McMurran, 2008), beziehungsweise der narzisstischen Persönlichkeitsstörung (Ritter et al., 2011) fanden, in Beziehung mit anderen Störungsdimensionen fehlen jedoch entsprechende Studien.

4.2. Schlussfolgerungen

4.2.1. Implikationen der Studie 1

Studie 1 schlägt kontinuierliche Störungsdimensionen vor, wie sie alternativ zur bestehenden Konzeption der zehn dichotomen Persönlichkeitsstörungen in DSM-5 und ICD-11 verwendet werden könnten. Der bestehenden Definition mangelt es an Validität und Reliabilität (Clark, 2007; Farmer, 2000). Die „DSM-V Research Planning Conference on Personality Disorders“ (abgehalten im Dezember 2004 in Arlington, USA) kam zum Schluss, dass die meisten psychiatrischen Symptome auf einem Kontinuum auftreten – eine klare Abgrenzung zwischen Störung und Normalität existiere nicht. Persönlichkeitsstörungen scheinen

demzufolge nicht diskrete klinische Zustände mit distinkten Ätiologien darzustellen, sondern eher Unterscheidungen entlang verschiedener Dimensionen allgemeiner Persönlichkeits-Funktionen (Widiger et al., 2005). Folglich sind Persönlichkeitsstörungen phänomenologisch als pathologische Abweichungen (d.h. extreme Pole) auf allgemeinen Persönlichkeitsdomänen wie den Big Five zu verstehen (Coker et al., 2002; Widiger, 2011). Nichtsdestotrotz wurde eine totale Isomorphie zwischen normaler und pathologischer Persönlichkeit kürzlich von der DSM-5 Arbeitsgruppe kritisch hinterfragt (Krueger et al., 2011).

Zahlreiche Studien konnten demonstrieren, dass fast alle konzeptuellen Probleme der DSM-IV Persönlichkeitsstörungen die Konstrukt- und Inhaltsvalidität betreffen (Clark, 2007). Genannt wurden unter anderem: Übermäßig hohe Komorbidität innerhalb und zwischen den Achsen; überlappende Kriterien und fehlende Unterscheidung von Kriterien; Inkonsistenzen von Merkmalen, Aspekten und Dimensionen der Kriterien; illusorische diagnostische Abgrenzungen; unklarer Symptom-Geltungsbereich; phänomenologische Heterogenität der Diagnosen; und Instabilität der Diagnosen (Clark, Livesley, & Morey, 1997; Farmer & Chapman, 2002; Oldham & Skodol, 2000; Trull & Durrett, 2005; Tyrer et al., 2007; Verheul & Widiger, 2004; Widiger, 2003). Ein weiteres, fundamentales Problem der aktuellen Definition ist die Diagnose „Persönlichkeitsstörung nicht weiter definiert“ (im Englischen: „Personality disorder not otherwise specified“). Obwohl als Restkategorie gedacht, bildet sie vermutlich die häufigste Diagnose (Trull & Durrett, 2005; Verheul & Widiger, 2004). Dies liegt im Wesentlichen am Unvermögen der bestehenden diagnostischen Kriterien alle relevanten maladaptiven Persönlichkeitseigenschaften adäquat abzudecken.

Mit einem empirisch hergeleiteten dimensionalen Modell der normalen und pathologischen Persönlichkeit können alle diese Problemfelder entscheidend revidiert werden. Der Vorteil eines dimensionalen Modells wäre die Möglichkeit, einzigartige und individuelle Trait-Charakteristiken zu beschreiben. Nebst diesen idiosynkratischen Persönlichkeitsprofilen könnte ein solches Modell auch eine befriedigende Abdeckung verschiedenster psychopathologischer Persönlichkeitseigenschaften gewährleisten (Trull & Durrett, 2005;

Widiger et al., 2005). Ein weiterer Vorteil eines dimensionalen Modells wäre die Beibehaltung von Informationen unterschwelliger Traits wie Neurotizismus, welche signifikant mit zahlreichen Achse I Störungen assoziiert sind (Calkins et al., 2009; Christensen & Kessing, 2006). Die Anlehnung eines dimensionalen Modells an die Grunddimensionen der Persönlichkeit ermöglicht die Verknüpfung mit einer beachtlichen Menge an Forschungsergebnissen aus Bereichen der Verhaltensgenetik oder Persönlichkeitspsychologie. Dies würde das Verständnis pathologischer Persönlichkeitsstrukturen entscheidend erleichtern. Außerdem ermöglicht die Integration konventioneller Persönlichkeitsmodelle wie dasjenige des FFM die Anwendung etablierter und gut validierter Forschungsinstrumente und Erhebungsmethoden aus dem Bereich der Psychologie (Widiger & Lowe, 2008).

Ein weiterer wichtiger Aspekt den es zu beachten gilt, ist die klinische Nützlichkeit. Wenn es letztlich zu einer Entscheidung pro oder kontra eines neu definierten dimensionalen Modells kommt, wird die Implementierung und Handhabung eines solchen Modells im klinischen Alltag entscheidend sein (Clarkin & Huprich, 2011). Die Nützlichkeit eines Modells ist elementar, denn diagnostische Systeme sollten im Endeffekt immer dem Wohlbefinden und der Gesundheit eines Menschen dienlich sein. Folglich sollte das Modell primär Diagnostik, Prognostik, Prävention und Intervention erleichtern und verbessern. Die Autoren des DSM-IV-TR betonten, dass ein hilfreicher Leitfaden für die klinische Praxis die höchste Priorität genieße (American Psychiatric Association, 2000). Dies wird auch für die aktuelle Revision Gültigkeit haben. Ob aber ein alternativer dimensionaler Ansatz die klinische Entscheidungsfindung und Kommunikation zuverlässiger und präziser leiten kann, ist immer noch Gegenstand kontroverser Diskussionen (First, 2005; Huprich & Bornstein, 2007; Shedler et al., 2010). Bisher wurden in dieser Hinsicht sehr wenige Studien durchgeführt; es gibt jedoch erste empirische Befunde, welche dimensionale Modelle klar bevorzugen (Lowe & Widiger, 2009; Samuel & Widiger, 2006; Verheul, 2005). Nichtsdestotrotz herrscht Einigkeit, dass weitere Forschungsarbeiten, insbesondere klinische Feldstudien, notwendig sind, um die Frage nach der Nützlichkeit abschließend zu beantworten (Clarkin & Huprich, 2011; First, 2005).

Es muss jedoch auch eindrücklich betont werden, dass die Konstruktvalidität eine Grundvoraussetzung der klinischen Nützlichkeit darstellt (Krueger et al., 2011; Verheul, 2005). Verbesserung der Ersteren erhöht konsequenterweise die Letztere. Nur eine zutreffende und präzise Störungsdefinition ermöglicht erfolgreiches Arbeiten, sowohl in der Forschung als auch im klinischen Alltag. Darum soll an dieser Stelle abschließend hervorgehoben werden, dass ein dimensionales Modell der Persönlichkeitsstörungen, wie es von der DSM-5 Arbeitsgruppe vorgeschlagen wird, gegenüber dem kategorialen Konzept klar zu bevorzugen sei.

4.2.2. Implikationen der Studie 2

Der Zusammenhang zwischen verschiedenen Formen von Childhood Adversity und Persönlichkeitsstörungen verdeutlicht, dass Probleme in der Schule und in der Familie weitreichende Konsequenzen haben können. Es gilt insbesondere zu beachten, dass dieser Zusammenhang nicht bloß für klinisch manifeste und diagnostizierte Störungen gilt, sondern auch für sub-klinische Ausprägungen. Der Anteil der Personen in der Allgemeinbevölkerung, die hiervon betroffen sind, kann nur geschätzt werden. Beruhend auf umfassenden Studien zum Thema berechneten Experten, dass die Prävalenz von Kindmissbrauch und Persönlichkeitsstörungen unabhängig voneinander je ungefähr 10% beträgt (Gilbert et al., 2009; Lenzenweger, 2008). In Patientenstichproben mit diagnostizierten Persönlichkeitsstörungen beträgt die Prävalenz von Missbrauch während der Kindheit über 70% (Battle et al., 2004; Bierer et al., 2003; Laporte & Guttman, 1996). Es wird angenommen, dass mit Schweregrad und Häufigkeit der aversiven Erfahrungen auch die Ausprägung der psychopathologischen Symptome zunimmt (Gilbert et al., 2009). Folglich dürfte die Prävalenz von schweren Missbrauchsformen bei Personen mit sub-klinischer Persönlichkeitsproblematik eher etwas tiefer ausfallen.

Nichtsdestotrotz ist Missbrauch im Zusammenhang mit pathologischen Persönlichkeitsdimensionen ein bedeutender Risikofaktor. Denn im Gegensatz zu anderen Störungen sind die dysfunktionalen Verhaltens- und Erlebensmuster bei

Persönlichkeitsstörungen ziemlich starr und überdauernd. Trotz Adaptierung und Symptomremission im Alter kann die Belastung und/oder Beeinträchtigung das ganze Leben lang anhalten (Torgersen, 2009). Nebst der subjektiven Belastung und der funktionalen Beeinträchtigung durch die maladaptive Persönlichkeitsstruktur gilt es in diesem Kontext auch die aus der Symptomatik resultierenden Konsequenzen zu beachten. Die negativen Folgeerscheinungen bei Persönlichkeitsstörungen sind vielfältig und beeinflussen das globale Funktionsniveau, die erfolgreiche Lebensbewältigung und die Integration in die Gesellschaft wesentlich (Cohen, Crawford, Johnson, & Kasen, 2005; Samuels, 2011).

Ähnlich wie andere Risikofaktoren auch ist Childhood Adversity nicht spezifisch mit Persönlichkeitsstörungen assoziiert. Kessler et al. (1997) konnten zeigen, dass negative Kindheitserlebnisse für eine Vielzahl von psychischen Störungen prädisponieren. Wiederum ist auch bekannt, dass die Komorbidität zwischen und innerhalb der Achsen sehr hoch ist (Kessler, Chiu, Demler, Merikangas, & Walters, 2005; McGlashan et al., 2000), was die Bedeutung klar umschriebener Risikofaktoren und Indikatoren unterstreicht. Diesbezüglich kommt Schulproblemen wie Schikanierung und Gewalt unter Kindern eine zentrale Bedeutung zu. Unabhängig davon, ob Schulprobleme nun Ursache oder Folge darstellen, sind sie zweifelsohne Faktoren, welche hochsignifikant zur Ätiopathogenese einer Störung beitragen (Arseneault, Bowes, & Shakoor, 2010). Als manifeste Einflussfaktoren bieten sie Ansatzpunkte für Prävention und Intervention. Samuels (2011) erachtet folglich das Untersuchen von modifizierbaren Risikofaktoren als eine der bedeutendsten Zielsetzungen der epidemiologischen Forschung.

Im Gegensatz zum geschützten und privaten Kontext familiärer Probleme, welche für Außenstehende schwer zu erkennen und zu verstehen sind, können im Umfeld der Schule Probleme leichter erkannt, thematisiert und bewältigt werden. Interventions- und Präventionsprogramme zu Gewalt unter Kindern und Jugendlichen fanden daher in den letzten Jahren auch starken Anklang an Schulen (Nikitopoulos, Waters, Collins, & Watts, 2009), obwohl deren Effektivität oftmals nicht oder nur unzureichend evaluiert wurde (Wilson, Gottfredson, &

Najaka, 2001). Es fand sich außerdem, dass sich die Effektivität zahlreicher Programme als eher schwach oder moderat herausstellte (Wilson et al., 2001). Schulen werden immer häufiger zu Instrumenten der Früherkennung familiärer Probleme, da diese neben dem Schulpersonal auch Anlaufstellen für Kinderpsychologen, Sozialarbeiter und andere Aufsichtsbehörden bieten (Smith & Sandhu, 2004). Diese Fachgremien sind auf Themen wie innerfamiliäre Missstände spezialisiert und sensibilisiert. Durch ärztliche Untersuchungen im Rahmen des Schulprogramms können zum Beispiel auch erste Anzeichen für häusliche Gewalt oder andere Missbrauchsformen erkannt werden (Dubowitz & Bennett, 2007).

Zusammenfassend lässt sich festhalten, dass Childhood Adversity ein zentraler und bedeutender Aspekt in der Ätiopathogenese von Persönlichkeitsstörungen darstellt. Nebst Mobbing und Gewalt können sich im Kontext der Schule zudem auch Probleme manifestieren, welche sich ansonsten eher im verborgenen und geschützten familiären Umfeld abspielen. Deswegen bieten Schulen eine geeignete Plattform für Diagnostik, Prävention und Intervention. Entsprechende Programme benötigen jedoch einer eingehenden Prüfung und Evaluation.

4.2.3. Implikationen der Studie 3

Neuropsychologische und -physiologische Prozesse sind von fundamentaler Bedeutung für das Verständnis psychischer Störungen. Obwohl man noch weit davon entfernt ist, die neurologischen Korrelate und Marker psychischer und psychopathologischer Vorgänge zufriedenstellend darzustellen, so muss man doch davon ausgehen, dass letztere sich im Gehirn abbilden lassen. Die Psyche – oder anders gesagt: Das Bewusstsein – ist im Endeffekt das Produkt des Gehirns, und die Zusammenhänge zwischen Psyche und Gehirn sind struktureller und funktioneller Art (Gierer, 2008).

Die Haupterrungenschaft einer jahrtausend währenden Evolution des Gehirns sind fortgeschrittene, hoch-adaptive psychologische Mechanismen. Die allgemeine Intelligenz ist

zwangsläufig das Produkt eines evolutionären Prozesses und ein höchst bedeutender und notwendiger Mechanismus zur Adaption an die Umwelt (Geary & Huffman, 2002; Kanazawa, 2004). Die phylogenetische Abstammung und die ontogenetische Transition der Intelligenz zeigt sich mitunter auch in ihrer hohen Heredität von 70-80% (Deary et al., 2010). Grob vereinfacht sind kognitive Funktionen als Bausteine des Bewusstseins zu verstehen, die sich evolutionär herausgebildet haben und durch natürliche Selektion weitervererbt wurden. Nur aufgrund unserer Intelligenz sind wir bewusstseinsfähig und unterliegen folglich auch unterschiedlichen Bewusstseinszuständen und Störungen des Bewusstseins. Und diese Störungen betreffen auch die psychische Anpassung.

Die ausgeprägte Intelligenz des Menschen ist die Eigenschaft, aufgrund welcher sich unsere Art und Lebensform grundsätzlich von allen anderen Spezies unterscheidet (Sherwood, Subiaul, & Zawidzki, 2008). Intellektuelle Fähigkeiten bilden die Grundvoraussetzung für eine erfüllende und erfolgreiche Lebensführung. Sie ermöglichen das erreichen von Zielen und das Bewältigen von Problemen oder Krisen – und sie bewahren uns vor Misserfolg und Versagen in fast allen Bereichen des sozialen Lebens (Gottfredson, 1997). Die treibende Kraft menschlichen Erlebens und Verhaltens ist das Bedürfnis nach Kontrolle der (sozialen) Umwelt, und die Fähigkeit, die uns dieses Agieren und Reagieren auf externe Stimuli ermöglicht, ist die Intelligenz (Geary, 2005). Nur ein hoch-adaptiver kognitiver Apparat kann sich der Umwelt und deren Veränderungen anpassen. In diesem Kontext ist es nicht verwunderlich, dass kognitive Defizite die erfolgreiche Lebensführung drastisch beeinflussen können. Die Konsequenzen einer neuronalen Beeinträchtigung werden in ihrer ganzen verstörenden Dominanz unter anderem im Erleben und Verhalten von Alzheimerpatienten ersichtlich (Ballard et al., 2011).

Aufgrund der Ausführungen oben ist es nicht verwunderlich, dass verminderte kognitive Fähigkeiten mit einer Vielzahl von Störungen assoziiert sind (Mortensen et al., 2005; Weiser et al., 2004). Intelligenzminderung ist keinesfalls spezifisch für Persönlichkeitsstörungen. Auch stellt sich die Frage, wie Intelligenz und Psychopathologie kausal verknüpft sind. Es ist denkbar, dass die kognitive Leistungsfähigkeit sowohl Ursache als auch als Folge psychischer Störungen

darstellt. Die Befunde zahlreicher prospektiver Langzeitstudien suggerieren jedoch, dass eine intellektuelle Beeinträchtigung vorwiegend ein Risikofaktor für psychische Störungen darstellt, und nicht umgekehrt (Breslau et al., 2006; Koenen et al., 2009; MacCabe, 2008; Zammit et al., 2004). Zudem zeigen erste Befunde, dass tiefe prämorbide Intelligenz auch mit Persistenz, Schweregrad und Komorbidität nachfolgender Störungen assoziiert ist (Gale et al., 2010; Koenen et al., 2009).

In Zusammenhang mit Persönlichkeitsstörungen muss insbesondere auf die soziale Umwelt hingewiesen werden. Wie eingangs dieses Kapitels erwähnt, spielt die Intelligenz eine zentrale Rolle bei der Bewältigung und Kontrolle der sozialen Umwelt. Es wurde postuliert, dass die Intelligenz signifikant zu einer erfolgreichen sozialen Anpassung beiträgt und dass sie die Entwicklung der Persönlichkeit zu regulieren vermag (Ackerman & Heggestad, 1997; Austin et al., 2002). Zudem konnte am Beispiel der borderline Störung oder antisozialen Verhaltens gezeigt werden, dass Persönlichkeitsstörungen mit Defiziten im Bereich der Emotionsregulation assoziiert sind (Brackett, Mayer, & Warner, 2004; Hertel, Schutz, & Lammers, 2009). Eine adaptive Emotionsregulation ist eine Kernkompetenz der sozialen Intelligenz und Voraussetzung für eine erfolgreiche Bewältigung der sozialen Umwelt (Lopes et al., 2004).

Es muss auch darauf hingewiesen werden, dass Persönlichkeitsstörungen aufgrund des Kriteriums der soziokulturellen Devianz primär Störungen der sozialen Interaktion darstellen. Beeinträchtigte allgemeine Intelligenz und insbesondere mangelnde sozial-kognitive Fähigkeiten sind folglich auch implizite Bestandteile der Symptomatik. Wie Koenen et al. (2009) bereits betont haben, gilt es auf diesen Umstand insbesondere auch im Hinblick auf Planung und Umsetzung von Präventions- und Interventionsmaßnahmen Rücksicht zu nehmen. Bisher scheint man aber auch in der Forschung dieser Problematik wenig Aufmerksamkeit geschenkt zu haben. Hier gilt es in Zukunft noch viel Arbeit zu leisten.

4.3. Integration der Befunde und Ausblick

Das Ziel dieser Doktorarbeit war die Betrachtung von biologischen, psychologischen und sozialen Faktoren, die in der Epidemiologie der Persönlichkeitsstörungen eine bedeutende Funktion einnehmen. Engel (1977) hatte in einem vielzitierten Artikel eindrücklich dargestellt, dass nur eine mehrdimensionale holistische Betrachtung und eine interdisziplinäre Integration von Befunden der komplexen Ätiopathologie einer Störung/Krankheit gerecht werden. In der aktuellen Literatur wird folglich mit zunehmender Evidenz ein multi-kausales Gen-Umwelt Interaktionsmodell postuliert, welches die Entstehung und Aufrechterhaltung von Persönlichkeitsstörungen zu erklären versucht. Eine graphische Darstellung des Gen-Umwelt Interaktionsmodells folgt weiter unten. Solch ein Modell besagt, dass prädisponierende Gene mit Umweltfaktoren interagieren und dass die Anpassung der sozialen Umwelt an genetische Einflüsse das maladaptive Persönlichkeitsfunktionieren verursacht und aufrechterhält (Livesley & Jang, 2008; Torgersen, 2009). Um ein solches Modell konkret und spezifisch zu beschreiben, ist es wichtig, sich der ganzen Bandbreite des biopsychosozialen Forschungsspektrums zu bedienen. Die Erkenntnisse der unterschiedlichen Forschungsfelder müssen sinnvoll und stringent integriert und interpretiert werden.

Ein Störungsmodell versucht die Entstehung einer Störung zu beschreiben und zu erklären. Hierfür ist unabdingbar und notwenig, dass das Kriterium – das heißt die Definition der Störung – korrekt und präzis erfasst wird. Ansonsten erklären die Prädiktoren nicht das, was sie zu erklären beabsichtigen. Im Falle der Persönlichkeitsstörungen wurde mehrfach und vehement eine Neudefinition des Konzepts gefordert. Das aktuelle Konzept nach DSM-IV und ICD-10 ist mit dem heutigen Wissen über die Störung nicht mehr vereinbar (Clark, 2007; Farmer, 2000; Widiger et al., 2005). In Übereinstimmung mit der Literatur wurden in Studie 1 auf einer psychologischen Ebene fünf Persönlichkeits-Dimensionen präsentiert, welche Persönlichkeitsstörungen adäquater und präziser beschreiben als die bestehenden zehn dichotomen Störungskategorien. Persönlichkeitsstörungen können als extreme Ausprägungen

normaler Persönlichkeitseigenschaften konzipiert werden. Sie unterscheiden sich nicht qualitativ von normalen, adaptiven Persönlichkeitsstrukturen, sondern primär quantitativ. Um Zusammenhänge zwischen Prädiktoren und Kriterium darzustellen, sollten in Zukunft diese fünf Persönlichkeits-Dimensionen verwendet werden. Dies erleichtert die Beschreibung und Interpretation von Persönlichkeitsstörungen erheblich. Für ein umfassendes und stringentes Modell ist es aber auch wichtig, auf die Bedeutung von Gen- und Umweltfaktoren einzugehen. Diesbezüglich konnte in den Studien 2 und 3 die Relevanz von Childhood Adversity und kognitiver Fähigkeiten hervorgehoben werden. Childhood Adversity ist vorwiegend ein Indikator für das Einwirken von sozialen Umwelteinflüssen, während die kognitive Leistungsfähigkeit primär einen Endophänotyp der biologisch-genetischen Vulnerabilität darstellt.

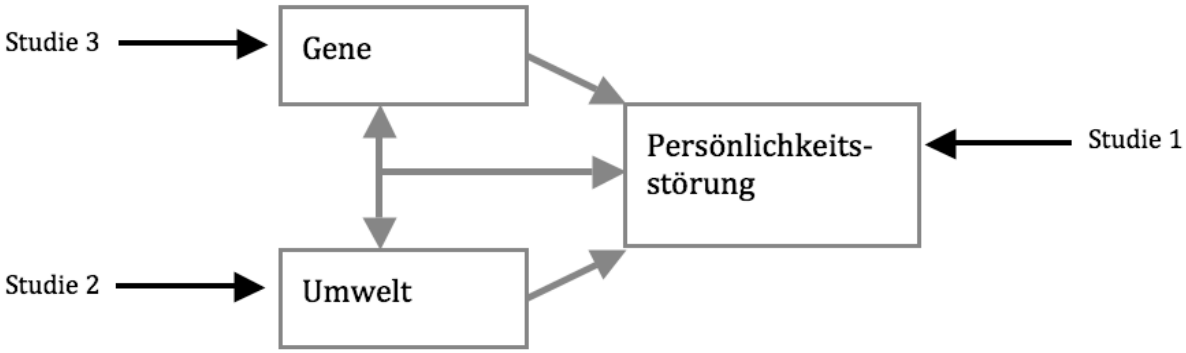

Abbildung 1: Relevanz der Studien 1-3 im Kontext des multikausalen Gen-Umwelt Interaktionsmodells

In Übereinstimmung mit dem multikausalen Interaktionsmodell und im Sinne des biopsychosozialen Konzepts leistet diese Doktorarbeit einen kleinen Beitrag zu einem umfassenderen und integrativen Verständnis der Epidemiologie der Persönlichkeitsstörungen (siehe Abbildung 1). Gleichzeitig zeigt die Arbeit auch auf, dass noch viele Forschungsbemühungen notwenig sind, um die Interaktion der einzelnen Komponenten zu verstehen, zu beschreiben und zu erklären. Ein kohärentes, umfassendes und prägnantes Störungsmodell impliziert, dass es die folgenden fünf Fragen zu beantworten vermag: „wer“,

„was“, „wie“, „wann“ und „warum“. Zur zeit ist die Forschung noch weit davon entfernt alle fünf Fragen zufriedenstellend beantworten zu können. Womöglich wird es ihr auch nie gelingen, alle diese Fragen zu beantworten. Mit zunehmendem Erkenntnisgewinn, mit immer präziseren und zuverlässigeren Erhebungs- und Auswertungsmethoden und dem kontinuierlichen Fortschritt im Bereich der Genetik, Neurophysiologie und -psychologie kann jedoch schrittweise ein kleiner Beitrag zu einem besseren Verständnis der Störung geleistet werden.

4.4. Nachtrag

Diese Doktorarbeit wurde nach Informationen konzipiert und verfasst, welche dem Autor im Spätjahr 2010 und im Frühjahr 2011 zur Verfügung standen. Nachdem die Arbeit mehrheitlich fertig gestellt war, überschlugen sich jedoch bezüglich der Revision der Persönlichkeitsstörungen für DSM-5 die Ereignisse. Im Frühjahr 2011 war bereits bekannt, dass die DSM-5 Arbeitsgruppe beabsichtigte, gewisse DSM-IV Kategorien beizubehalten um sie als Muster-Abgleich (engl. „Prototype Matching“) zu verwenden. Insoweit hatte dies auf die bestehende Arbeit keinen Einfluss, da diese einzig auf das dimensionale Trait-Modell der übergeordneten Faktoren normaler und pathologischer Persönlichkeit fokussierte, welches parallel dazu konzipiert wurde. Im Verlauf des Jahres 2012 stellte sich schließlich heraus, dass der in dieser Arbeit erläuterte dimensionale Vorschlag maßgeblich abgeändert wurde und dass die Arbeitsgruppe den Fokus fortan auf die bestehenden DSM-IV Störungskategorien setzte. Im Zuge dieser Revisionen konzipierte die DSM-5 Arbeitsgruppe ein Hybrid-Modell, welches entgegen überwältigender empirischer Evidenz eine Verbindung kategorialer und dimensionaler Konzepte darstellte. Anstatt die ungenauen und unspezifischen DSM-IV Störungskategorien aufzugeben, wurden die fünf übergeordneten Persönlichkeitsdimensionen zweckentfremdet, um sechs dieser Kategorien – notabene Kategorien, welche klar unzureichende Validität und Reliabilität aufweisen – dimensional zu erfassen. Fortan dienten die extrahierten fünf Dimensionen pathologischer Persönlichkeit primär der Beschreibung bestehender DSM-IV

Störungskategorien und stellten nur noch bedingt ein unabhängiges Modell dar (siehe hierzu auch Skodol, 2012, für ein Rational aus der Sicht der DSM-5 Arbeitsgruppe).

Zu diesem Zeitpunkt war diese Doktorarbeit bereits fertig verfasst und zur Begutachtung eingereicht, weshalb diese erneute Modifikation der Definition der Persönlichkeitsstörungen nicht mehr Eingang in diese Arbeit fand. Im Zusammenhang mit der Konzeption dieses inkohärenten Hybrid-Modells, das einer offensichtlichen Missachtung international und interdisziplinär konsensuell akzeptierter und mehrfach replizierter Forschungsergebnisse gleichkam, traten John Livesley and Roel Verheul resigniert aus der DSM-5 Arbeitsgruppe aus. Das Ausmaß dieses Konflikts bezeugen mitunter die dezidierten Worte von Allen Frances, ehemaliger Vorsitzender des DSM-IV Arbeitsausschusses, in einem Artikel aus Psychology Today vom 11. Juli 2012:

“As it stands now, the DSM-5 personality section is not readable, much less usable. It will be ignored by clinicians and will do grave harm to research. This is the sad product of small group of cloistered DSM 5 "experts" stubbornly ignoring the sharp criticism from within their own group and the near universal rejection of their proposals by everyone else in the field.”

Wie nicht anders zu erwarten, war ein solch inadäquates Modell nicht mehrheitsfähig und hielt einer kritischen externen Prüfung nicht stand. Folglich wurde es vom übergeordneten DSM-5 Arbeitsausschuss Ende 2012 abgelehnt. Zurück bleibt die traurige Feststellung, dass in der psychiatrischen Forschung aufgrund veralteter Denkstrukturen und unflexibler, dogmatischer Überzeugungen der Erkenntnisgewinn immer wieder untergraben wird. Die Konsequenz ist, dass auch im DSM-5 weiterhin die zehn unpräzisen und ungenauen DSM-IV Störungskategorien beibehalten werden. Dies ist das unrühmliche Ende eines Entscheidungs- und Entwicklungsprozesses, der die Forschung auf dem Gebiet der Persönlichkeitsstörungen abermals um viele Jahre zurückwerfen wird. Und dies nur, weil gewisse „Experten“ sich stur weigern, neue Erkenntnisse zu akzeptieren (Livesley, 2011).

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